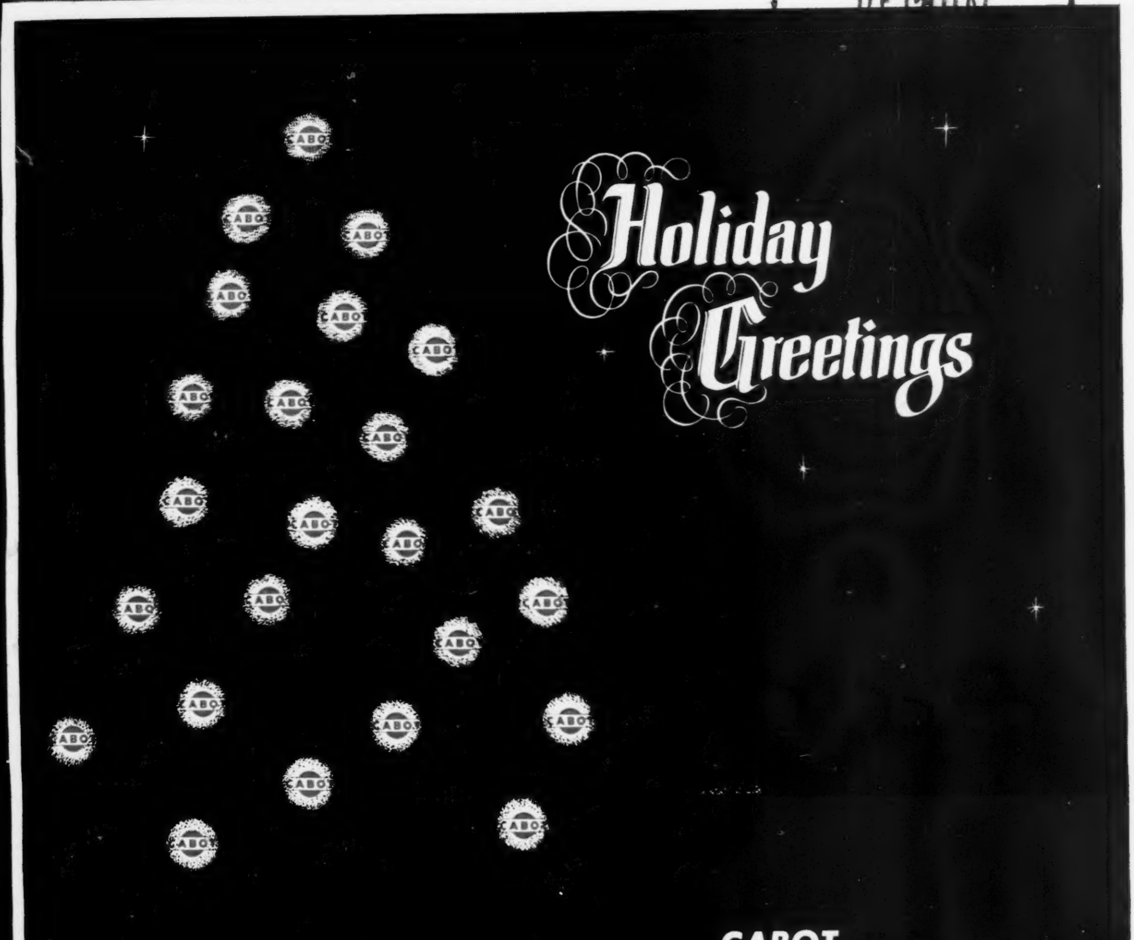
INDIA RUBBER WORLD

OUR 62nd YEAR

A BILL BROTHERS PUBLICATION

DECEMBER, 1950



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GOODYEAR

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Pliolite—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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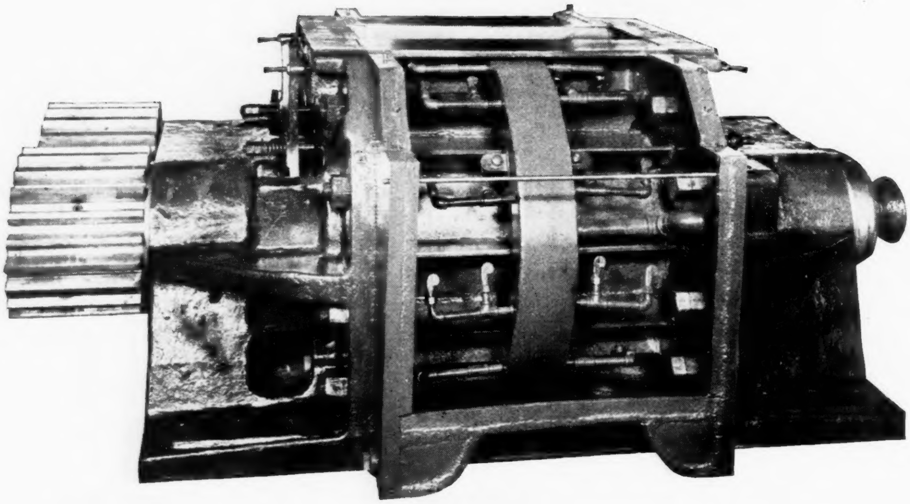

1

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Rotors, jackets, end frames and door top restored to original dimensions, and made amazingly resistant to abrasion with our exclusive hard-surfacing method: — all worn rings replaced with new standard dimension rings; new bearings, bolts, nuts, dowels, packing, etc. furnished as needed. Complete assembling and fitting door to body. Sixteen years specialized experience goes into every job.

2

We Will LEND You A Banbury Body

You can have your Banbury rebuilt, and yet be "down" only a few days. We will lend you a mixer body to use, at no extra cost to you. With this plan your mixer output need be interrupted only the time required to pull out your worn body and replace it with the body we lend you. Then away you go again at full speed, while we completely rebuild your own mixer body. When it is ready, you just swap again and return ours. We have at present No. 9 and No. 3A spray-type bodies available.

3

Parts Available For Quick Shipment

We can supply many parts for Banbury bodies, sizes 9, 11, 3 and 3A. Included are rotors, end frames, doors, and rings. All parts are in A1 condition. Many of these parts can be shipped immediately, subject only to prior sale. We have available also for immediate sale, or interchange, rebuilt No. 9 spray-type bodies and No. 3A spray-type bodies, all complete with door and cylinder.

SERVING THE RUBBER INDUSTRY — IWS

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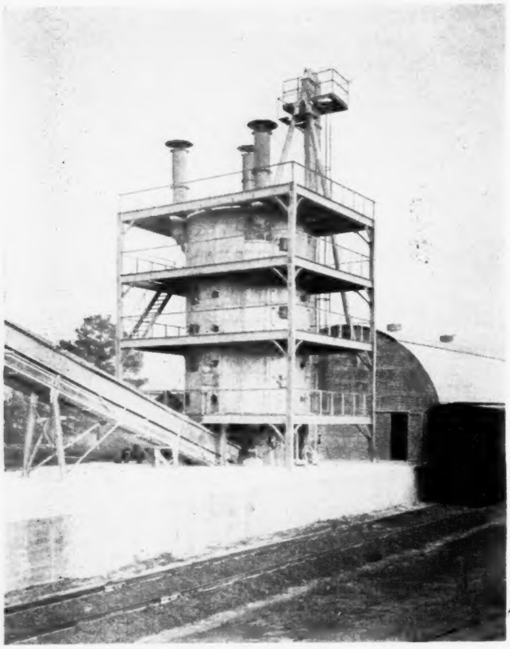
Solve Your Color Problems



World's largest calcining furnace for production of anhydrous kaolin pigments. (U. S. Pat. No. 2307239).

Announcing - - -
Los Angeles Warehouse

In order to augment our services to West Coast customers, we are now stocking several Burgess products at the California Warehouse, 1248 Wholesale St., Los Angeles 21, California.

These stocks are in charge of Merit Western Company of Los Angeles, whose telephone number is Tucker 5581. Ask for Mr. George R. Steinbach.

For rubber and plastic compounds "ICEBERG" provides excellent base color as a white mineral loading. It minimizes the use of expensive white pigments.

PROPERTIES INCLUDE:

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—Uniform pH

—Low moisture absorption

—Excellent processing and curing characteristics

—Minimizes die plating or ring coating (sticking of resinous and mineral materials to the die)

—Applicable as reinforcing pigment and filler to GR-S, natural rubber, butyl, vinyl, plastics, neoprene, etc.

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United channel blacks give matchless satisfaction with products in manufacture and in service.

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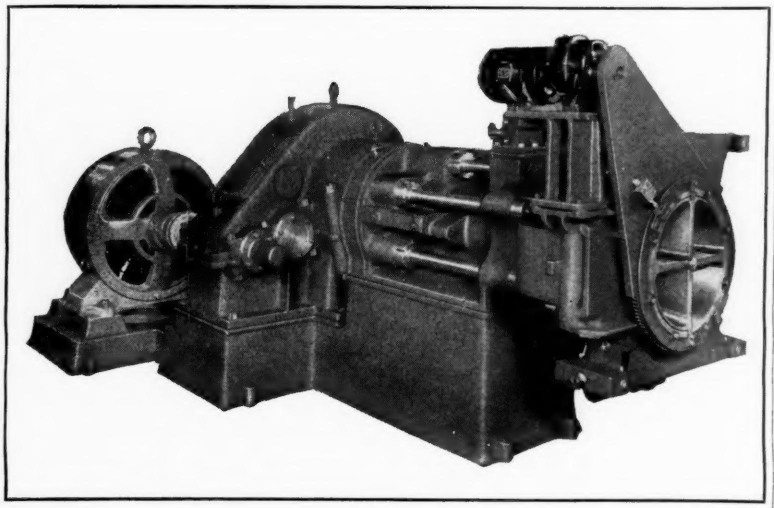
RUBBER & PLASTICS MACHINERY BULLETIN

Reporting News and Machine Design Developments

IN BUSINESS TO NRM REDUCE YOUR COSTS

30% MORE PRODUCTION OF RECLAIM STOCK WITH NEW NRM STRAINER SCREW



You can now strain 30% more natural or synthetic stock by equipping your NRM strainers with a newly developed conical nose screw. Also, the customary bulk of contaminated stock, which must ordinarily be cut off when changing screens, is eliminated.

More uniform pressure and flow are other advantages realized with this important new strainer development. There is little or no increase in power requirements, and temperatures are maintained at a lower level. Temperatures stay lower since virtually stagnant stock around the outer diameter of the strainer plate is eliminated.

The new conical nose screw can be incorporated into your present strainers having a screw which extends into the head at a constant diameter to within an inch or so of the strainer plate.

Your inquiry or request for quotation —accompanied by complete information about your strainer—will receive a prompt answer. Write National Rubber Machinery Company, 47 West Exchange Street, Akron 8, Ohio.

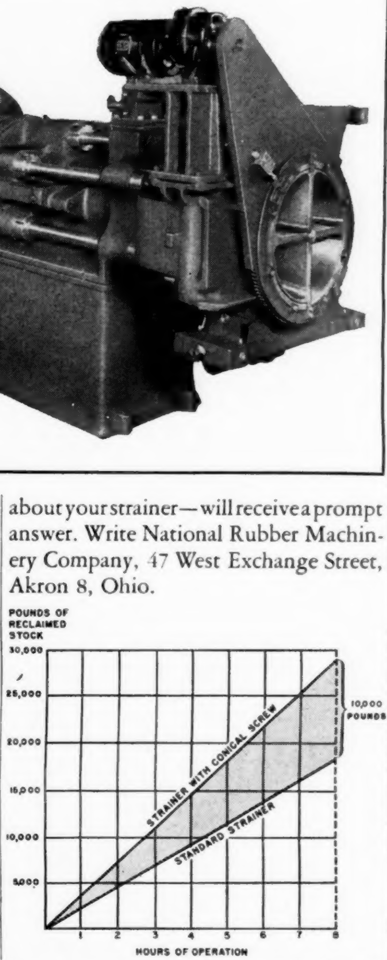
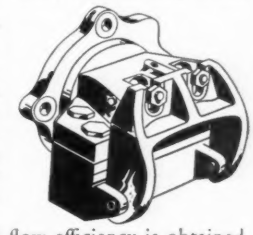


Chart compares amount of stock strained by two 8½-inch strainers. Lower curve is for standard strainer; upper curve is for new NRM quick-opening strainer equipped with the conical nose screw. In an eight-hour day, the strainer equipped with the conical nose screw produces an additional 10,000 pounds of stock.

New NRM Camelback Extruder Head easy to clean and change

NRM's newest camelback or tread-cap head demonstrates the simplicity of all of NRM's tuber and tuber accessory designs. The head is split horizontally, so that the upper half can be removed easily for cleaning at the end of a run. Die plates are clamped in place by a hinged drop gate, which can be opened readily for changing plates by merely loosening two swing bolts.



High material flow efficiency is obtained by elimination of roughness and small pockets which might cause sticking or burning of material passing through the head. This attention to profile and surface condition also reduces cleaning requirements.

The new extruder head is primarily for narrow sections of stock, such as those used in extruding camelback or tire tread cap sections. The same design can be used where a slab or ribbon is desired. The head can be applied to extruders of 4½ inches and larger. Two mounting styles are available—flange or screw type. Chrome plating (optional) is recommended.

NOW—COLD FEED EXTRUDING!

Many extruding jobs require pre-warming of the material on a two-roll mill, prior to feeding it into the extruder. This pre-warming can now be accomplished in the extruder itself, by use of a special cold-feed screw and liner which can be incorporated into any existing NRM rubber extruder.

Tests show that a large part of the compounds used in the mechanical goods extruding industry can be successfully fed at room temperature in the modified NRM extruder. Other compounds can be handled with additional modification.

The production rate of a given extruder will be reduced somewhat by incorporation of this feature. However, the elimination of the warm-up mill and labor for its operation, reduced maintenance and floor space requirements will materially reduce extrusion costs.

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PLANTS at Akron and Columbiana, Ohio and Clifton, N. J.
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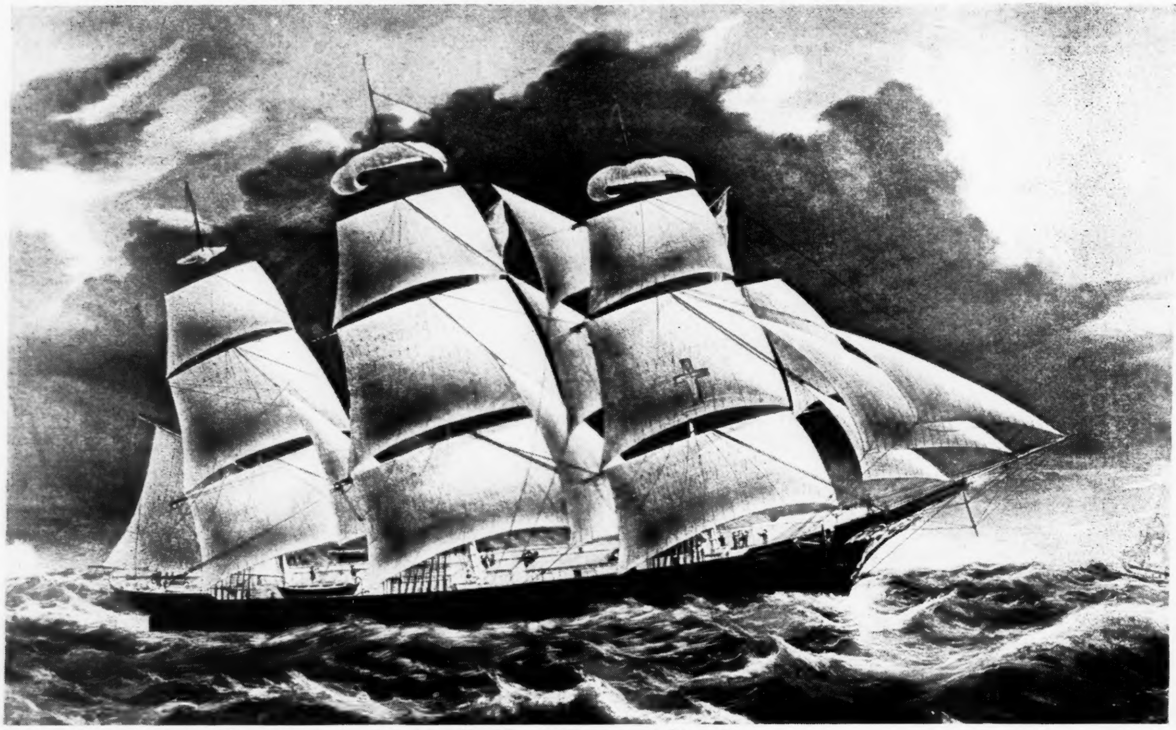
PIONEERS OF THE CENTURY

SECOND OF A SERIES



The clipper ship era, launched in 1845, sailed into fame on winds of the gold-rush frenzy. Although it reached its zenith in 1852, not until many years later could steam-driven craft equal the speed record of such clippers as the Flying Cloud.

BETTMANN ARCHIVE

1852 — The Clipper Ship

"IT'S that Yankee ingenuity," moaned British shipowners when New England's clippers cut into their lucrative business of carrying gold-rush hordes to California and hauling tea from China.

Yankee builders had seen that the times called for faster ships—a type that could sail the 19,000 miles 'round the Horn to San Francisco in 3 months instead of 13. So they cut away from the bulky orthodox designs and pioneered the trim, sleek clipper that put this country out in front on the high seas.

At the same time, ingenuity was proving a boon to other pioneers. The New Jersey Zinc Co., organized in 1848 for the purpose of smelting zinc from domestic ore, was running into one snag after another, even as its predecessors had.

But we contrived new and unique methods on each occasion and, after 4 years of continuous experimenting, discovered a means of producing Zinc Oxide directly from the ore and collecting it in large muslin bags. Known as the American Process, it provided the infant rubber industry with the first domestic zinc pigment: Horse Head Zinc Oxide.

For over a century, The New Jersey Zinc Co. has continued to pioneer outstanding developments, many of which have helped speed the progress of the rubber industry.

HORSE HEAD ZINC PIGMENTS

The Pioneer Line

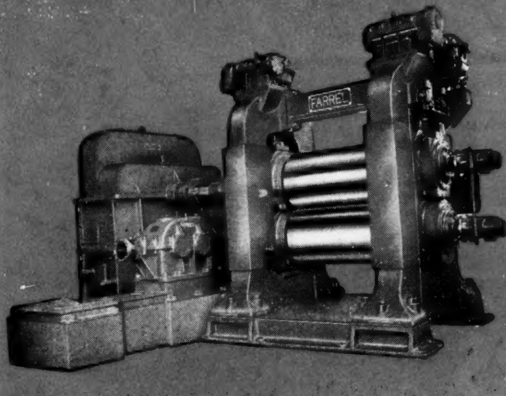
Most used by the rubber industry since 1852

HORSE HEAD PRODUCTS

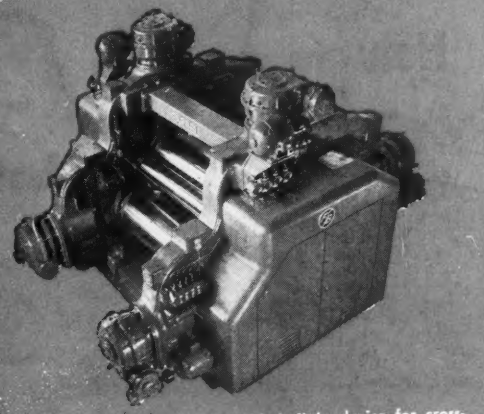
THE NEW JERSEY ZINC COMPANY

Founded 1848

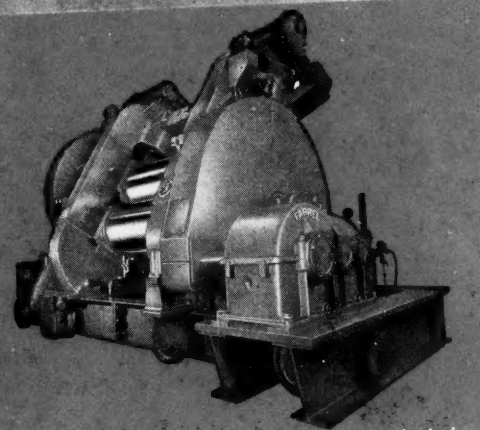
160 Front Street, New York 7, N. Y.



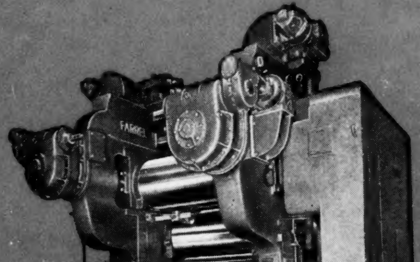
This two-roll calender has its gearing enclosed in a separate fabricated steel housing and connected to the rolls by universal couplings.



New four-roll Z-type calender with built-in device for crossing the roll axes to compensate for roll deflection. Hydraulic pullbacks eliminate backlash and hold the rolls firmly in their operating positions.



Two-roll inclined linoleum calender mounted on wheels for roll travel from oven to oven, with individual right angle motor drive for each roll, and individual motor adjustment for each screw of top roll.



In this four-roll calender, adjustment of rolls is by individual motor. Push-button control provides for adjustment of either roll end separately or both together.

WHAT IS NEW
IN CALENDER DESIGN?

In the last few years, Farrel-Birmingham has been responsible for many developments in the design of heavy equipment used in initial processing of rubber and plastics. New machines have been brought out, and conventional types have been modified and improved to meet changing requirements.

Among recent refinements in the design of calenders are:

1. Precision sleeve bearings with hydraulic pullbacks for holding rolls in positive operating position.
2. Improved lubrication system which provides for rapid circulation and cooling of oil to roll neck bearings.
3. Improved oil seals which retain oil in boxes and prevent contamination of stock.
4. Rolls drilled for more effective temperature control.
5. A built-in device which provides means for crossing the roll axes to compensate for deflection.
6. Roll adjusting mechanisms that permit finer adjustment of either roll end separately or both together.
7. Drive and connecting gears removed from calender and enclosed in a separate housing.

In addition to refinements such as these, great strides have been made in designing housings, journal boxes and other parts of the proper materials, proportions and weights to withstand the stresses and strains encountered in processing a wide variety of stocks at higher speeds.

When you need a calender, why not ask Farrel-Birmingham engineers to make recommendations. Their extensive experience in designing calenders for all kinds of uses is invaluable in selecting the right machine for any specific purpose.

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

Farrel-Birmingham ®

FB-621

How to make a *Stronger bond* between rubber and fabric

MORE STRENGTH HERE. Pre-treatment of the tire fabric with Resorcinol Adhesives in the latex mixture assures a stronger bond between the fabric and the tread.

TIRES, belting and other products which include laminations of rubber and fabric or cords are serviceable only as long as the parts hold together. To obtain best adhesion of rubber to fabric or cords, it is common practice to pre-treat the fabric in a mixture of rubber latex and some adhesive material. For this purpose adhesives prepared with Koppers Resorcinol are proving highly successful.

Recent tests have shown that Koppers Resorcinol Adhesives used in the pre-dip treatment produce a much stronger bond than casein. This is true with cotton, rayon and nylon fabrics but the most marked improvement is shown on the rayon and nylon.

You can prove this for yourself in your own laboratories. Write for a sample of Koppers Resorcinol and a copy of our Technical Bulletin.

KOPPERS

KOPPERS COMPANY, INC.

Chemical Division

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REG. U. S. PAT. OFF.

with increased fillers or extenders can help maintain production without loss of quality.

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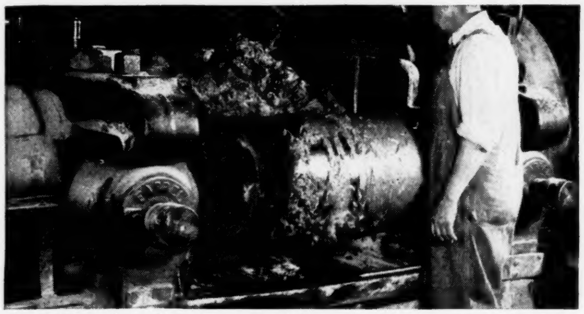
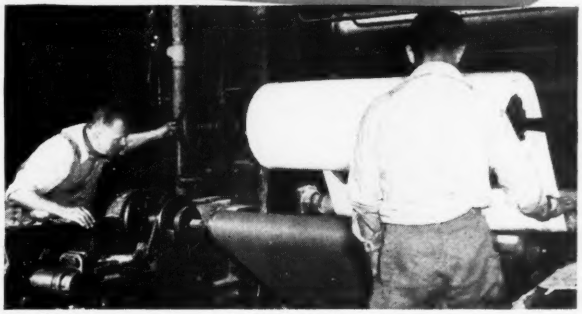
* **Are you** concerned about catalytic metals in your compounds? INDONEX shows less than one part per million of copper or manganese by spectrographic analysis.

PRESS IS A BALDWIN

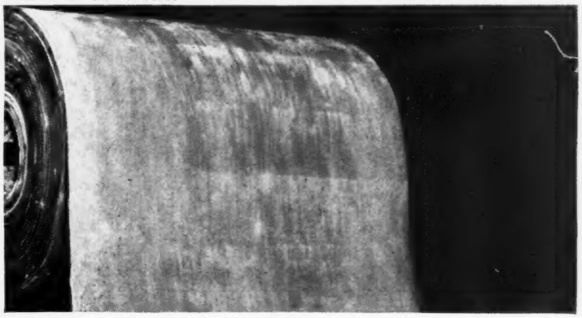


Plasticizing the rubber compound by passing it between rolls. The material is then used for impregnating the carcass, or is calendered for cover stock.

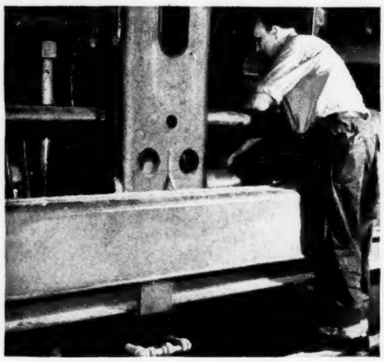


Frictioning the web material. Cotton duck is run against a slower moving roll carrying rubber compound, which is forced into the weave of the fabric.

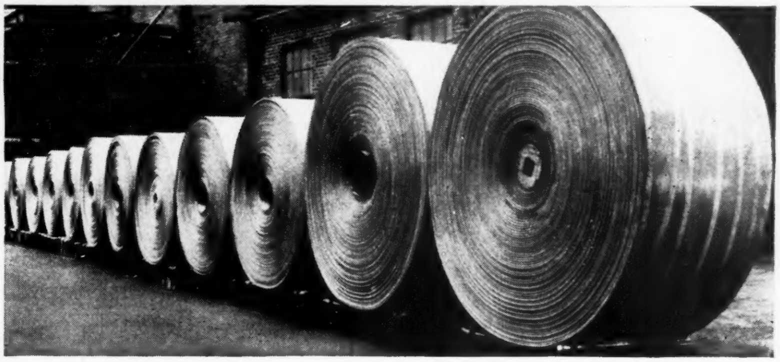
Building the belt body, by applying layers of cover stock to the frictioned carcass. Layers are rolled down to insure adhesion, and eliminate trapped air.



A roll of belting, ready for curing. The unusually wide product which the new press makes possible is suggested by this illustration.



Guiding the uncured belting in the Baldwin press, prior to curing.



An order for a "mile of belting" ready for shipment.

The Baldwin Locomotive Works, Philadelphia 42, Pa., U. S. A. Offices: Boston, Chicago, Cleveland, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Seattle, St. Louis, Washington. In Canada: Baldwin Locomotive Works of Canada, Ltd., Toronto, Ontario.

BLW
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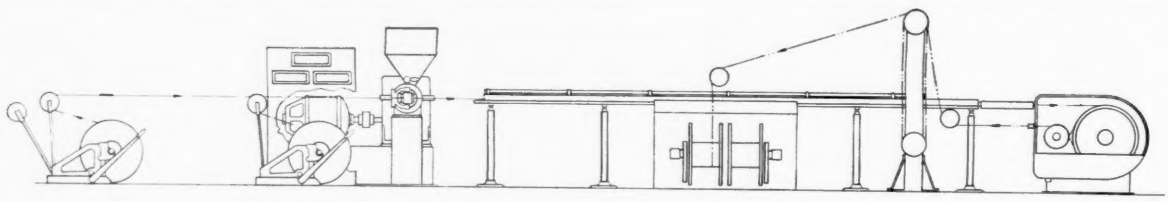
HYDRAULIC PRESSES



For light colors that stay light at economical production costs

In white or light-colored foam rubber products, you can protect the rubber thoroughly—yet keep discoloration and staining to an absolute minimum with WING-STAY S—Goodyear's easily-dispersed, liquid antioxidant for use in natural and synthetic rubber latices.

WING-STAY S has the best available balance of non-discoloring characteristics, antioxidant properties and low cost, available in today's market.

WING-STAY S is equally effective in other types of synthetic and natural rubber compounds and you can get this use-proved product for inclusion in your natural rubber stocks directly from Goodyear, or already incorporated in GR-S 26 from ORR.

Either way you buy WING-STAY, it's your assurance of low-cost protection and lasting light color. Write today for full details and sample to:

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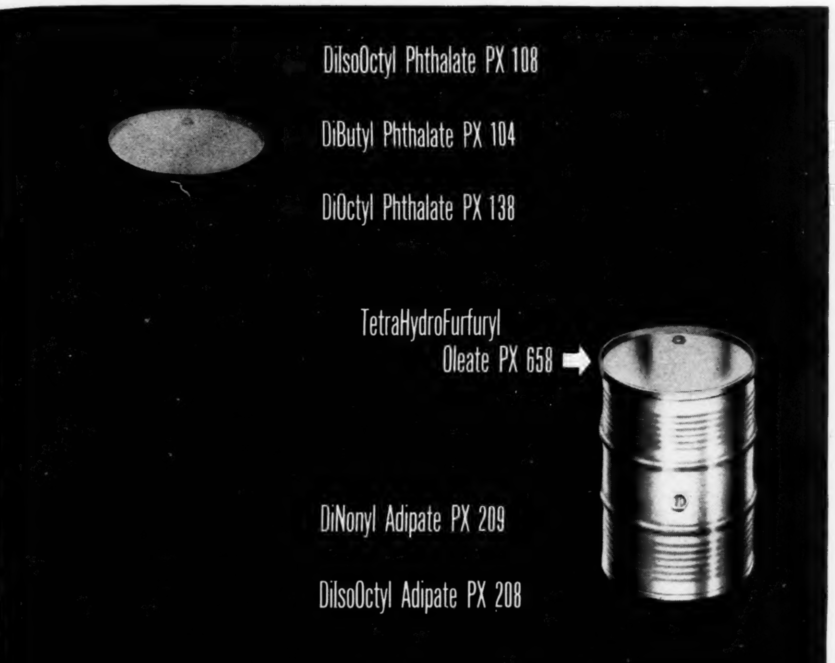
PITTSBURGH PX PLASTICIZERS

in the quickly identifiable *Color-coded* drums



Only *Pittsburgh* gives you this real *plus* value when you buy plasticizers!

For *only Pittsburgh* PX Plasticizers are delivered in brightly painted drums—*coded* in a combination of *drum* color and *top* color to show at a glance *the exact contents of the drum.*

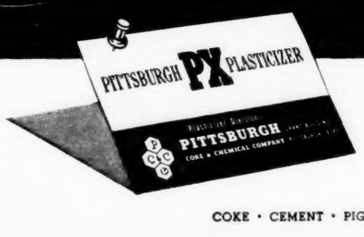
No more mix-ups in shipping, delivery, handling, and storage! No more using the contents of a wrong drum because the label was removed, obscured, or misread. The contents of each drum of *Pittsburgh* PX Plasticizer can be quickly and easily identified all the way, all the time!

A display card showing this color code, and giving important commercial information as well, has been prepared! Copies of this, suitable for posting in your warehouse, receiving dock, or mixing room, are available upon request.

Pittsburgh PX Plasticizers

PX-104 DiButyl Phthalate
PX-108 DiIsoOctyl Phthalate
PX-138 DiOctyl Phthalate
PX-208 DiIsoOctyl Adipate
PX-209 DiNonyl Adipate
PX-404 DiButyl Sebacate
PX-408 DiIsoOctyl Sebacate
PX-658 TetraHydroFurfuryl Oleate
PX-916 TriPhenyl Phosphate
PX-917 TriCresyl Phosphate

Check the above list for your needs—then write today for individual bulletins which give full commercial and technical information about each of the *Pittsburgh* PX Plasticizers.



P
C & C
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Plasticizer Division

PITTSBURGH COKE & CHEMICAL COMPANY

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YES — with THIOKOL PRODUCTS.* The addition of TP-90B or TP-95 to your product, whether it be of natural rubber, neoprene, GR-S or the nitrile rubbers, adds the plus-factor of flexibility at extreme low temperatures.

For specialty applications requiring low temperature resistance without the use of plasticizers, try *Thiokol ST* synthetic rubber. If it is a caulking or filleting application, investigate the advantages of *Thiokol LP-2* liquid polymer. Both have excellent solvent resistance.

Do you have a problem of maintaining flexibility at low temperatures? The resources of Thiokol Corporation are at your command to render assistance in the development or betterment of your product. Write us today for information on:

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for NEOPRENE, GR-S, NATURAL RUBBER

Thiokol TP-95
for BUNA N's, VINYL PLASTICS

Thiokol ST
for OIL RESISTANT COMPOUNDS

Thiokol LP-2
for CAULKING and FILLETING COMPOUNDS

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INDIA
RUBBER
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VOL. 123 NO. 3 DECEMBER, 1950

Strain Data as a Basis for Comparing Cures of Rubber Compounds[1]

James W. Schade[2]

FOR many years marked differences of opinion have existed among rubber compounders as to relative curing rates and states of cure as judged from modulus, tensile strength, and elongation data. In 1945, in order to ascertain how widely times of cure selected as optimum from the same data would vary, stress-strain values for GR-S produced at 15 plants were submitted to a number of skilled compounders. The times selected for optimum cure of the same specimens differed by 10 to 40 minutes, with an average spread of 28 minutes. Differences in time of optimum cure among the 15 specimens, as selected by individual compounders, varied from 15 to 45 minutes. It is not conceivable that the actual time to attain optimum cure of GR-S from the producing plants varied by as much as these values indicate.

It was evident, moreover, that there was no common concept among skilled compounders as to the relation between stress-strain data and opitmum cure. Had there been a common method of judging cures, the differences in the reported values would have been much smaller. Three individuals used a method consisting of plotting modulus-time of cure curves and drawing tangents to them according to a prescribed rule; the times which corresponded to the points of contact indicated the optimum cure. Even though five cures were made to insure uniform plotting, the times selected varied by a maximum of 15 minutes and by six minutes on the average. It was quite evident that an accurate and duplicable method of selecting optimum cures from such data was needed, but up to the present time none has been proposed.

Discussion

The mathematical relationship recently discovered between time of cure and the elongation of a test strip under specified load[3] seems to offer a solution to the problem of determining quickly and accurately the relative curing rates and states of cure of different polymers and different compounds. This relationship between time of cure and elongation under a specified load is expressed by:

$$(t_x - t_o)\ (E_x - E_\infty) = \frac{1}{k}$$

where t_x and E_x are any time of cure and the corresponding elongation, t_o, E_∞, and k are parameters characteristic of the compound. Accordingly, a plot of times of cure *vs.* elongations is an hyperbola whose asymptotes intersect the time axis at $t = t_o$ and the elongation axis at $E = E_\infty$; the magnitude of the maximum curvature is indicated by k.[4]

Computation of the values of t_o and E_∞ may be made by substituting in the following formulae the times of vulcanization for three cures (t_1, t_2, t_3) and the corresponding elongations (E_1, E_2, E_3).

$$t_o = \frac{(t_2 - t_1)\ (t_3E_3 - t_1E_1) - (t_3 - t_1)\ (t_2E_2 - t_1E_1)}{(t_3 - t_1)\ (E_1 - E_2) - (t_2 - t_1)\ (E_1 - E_3)}$$

[1]The work reported herein was carried out under the sponsorship of the Office of Rubber Reserve, Reconstruction Finance Corp., in connection with the government synthetic rubber program.

[2] University of Akron Government Laboratories, Akron, O.

[3] F. L. Roth and R. D. Stiehler, India RUBBER WORLD, 118, 367 (1948).

[4] Dr. Stiehler in a letter to the editor of India RUBBER WORLD has supplied the following supplementary information on this mathematical relationship in addition to that found in the 1948 article, footnote [3]. His letter, under the heading of "Strain Test and State of Cure," was as follows:

"During the development of the strain test, it was found that values for strain at a fixed stress, when plotted against time of cure, fall on a hyperbolic curve. This discovery meant that the vulcanization process could be characterized by three parameters —t_0, the time at which incipient vulcanization begins; k, a reaction rate constant related to the rate of cure; and $E\infty$, a structure factor which indicates the inherent stiffness of the compound. Further, the mathematical relationship between time of cure, $(t_x - t_0)\ (E_x - E\infty) = 1/k$, should provide an objective method for determining the times of equivalent states of cure of two or more compounds.

"Unfortunately, however, the reaction rate constant, k, is a function of the stress as well as the rate of cure. Thus far, it has not been possible to derive a reaction rate constant dependent on rate of cure and independent of stress by means of the theoretical equations proposed for the stress-strain relationship of rubber vulcanizates. The full potentialities of strain data have, therefore, not been utilized.

"The paper by Mr. Schade proposes a method which overcomes this difficulty in using strain data to determine equivalent states of cure. In essence, empirical factors are determined in this method which in effect eliminates the dependency of the reaction constant, k, upon stress in determining state of cure. The same factors, apparently, can be used for similar types of compounds. Further experimental data will be required, however, to ascertain the extent to which these empirically determined factors may be generally applicable.

"In any case, the method proposed by Mr. Schade appears to offer an objective means for determining equivalent states of cure. It has promise as a useful tool for the comparison and development of rubber compounds."

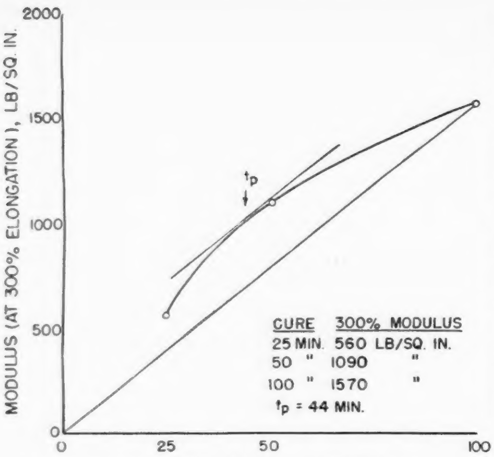


Fig. 1. 300% Modulus *vs.* Time of Cure

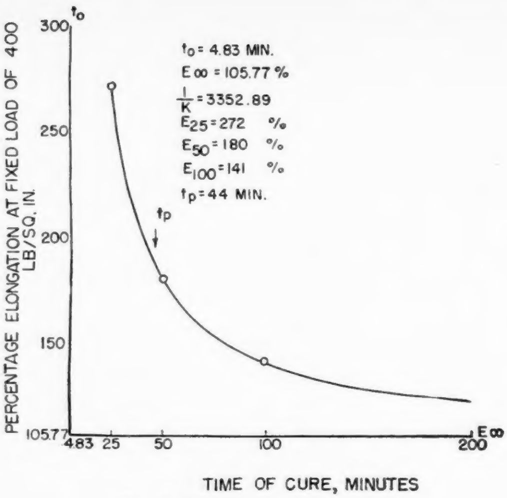


Fig. 2. Elongation *vs.* Time of Cure

$$E_\infty = \frac{(E_1 - E_2)(t_3E_3 - t_1E_1) - (E_1 - E_3)(t_2E_2 - t_1E_1)}{(t_3 - t_1)(E_1 - E_2) - (t_2 - t_1)(E_1 - E_3)}$$

It is to be noted that the denominators of the two equations are identical. The value of $\frac{1}{k}$ may now be ascertained from the original mathematical relationship between elongation and time of cure.

In considering rate of cure, it is evident that change per unit of time of either modulus (Figure 1) or of elongation (Figure 2) is constantly decreasing with increase in time of cure.

The extent of the change in modulus per unit of time at any selected point cannot be determined mathematically inasmuch as a formula relating modulus and time of cure is lacking. The change in elongation under constant load, however, may be accurately calculated from:

$$\frac{dE}{dt} = \frac{\frac{1}{k}}{(t_x - t_o)^2} \qquad (1)$$

$\frac{dE}{dt}$ would be expressed as change in percentage elongation per minute of cure. The negative value indicates a negative slope of the tangent, but does not affect the numerical value of $\frac{dE}{dt}$.

Similarly, the acceleration of this change may be calculated at any time of cure from the equation

$$\frac{d^2E}{dt^2} = \frac{2\left(\frac{1}{k}\right)}{(t_x - t_o)^3} \qquad (2)$$

$\frac{d^2E}{dt^2}$ would be expressed as acceleration per minute of the change in elongation per minute.

$\frac{dE}{dt}$ is the slope of the tangent to the hyperbola for any cure time, t_x; $\frac{d^2E}{dt^2}$ is the rate of change in slope.

These equations relating time of cure and elongation at a fixed load offer a means of selecting times of cure for two compounds (tested under similar conditions) at which the change in elongation per minute or the acceleration of this rate of change will be the same. If two compounds are to be vulcanized to the same value of $\frac{dE}{dt}$,

$$\text{then } \frac{dE}{dt} = \frac{\frac{1}{k_1}}{[(t_x)_1 - (t_o)_1]^2} = \frac{\frac{1}{k_2}}{[(t_x)_2 - (t_o)_2]^2}$$

whence

$$(t_x)_1 = (t_o)_1 + (t_x)_2\sqrt{\frac{1}{k_1} \div \frac{1}{k_2}} - (t_o)_2\sqrt{\frac{1}{k_1} \div \frac{1}{k_2}} \qquad (3)$$

By substitution in equation (3) values of $(t_o)_1$, $(t_o)_2$, $\frac{1}{k_1}$ and $\frac{1}{k_2}$ determined for two compounds, an equation is obtained in which only $(t_x)_1$ of one compound and the time of equivalent cure of the other compound, $(t_x)_2$, are unknown. By assigning different values to $(t_x)_2$, the corresponding values of $(t_x)_1$ may be found and a chart drawn relating the times required for equivalent cures over any time range desired, i.e., the periods required to attain the same values for $\frac{dE}{dt}$.

The following data obtained in comparing Y-103 GR-I with Y-104 GR-I and Y-103 GR-I with Y-105 GR-I[5] will serve for illustration. These tests were made on a gum stock that had been cured for 20, 40, and 80 minutes at 292° F. (Table 1.)

By substitution of t_o and k values of Y-103 and Y-104 in equation (3),

$$(t_x)\text{Y-103} = 1.38(t_x)\text{Y-104} - 23.63$$

Similarly, by substitution of corresponding values for Y-103 and Y-105,

$$(t_x)\text{Y-103} = 1.38(t_x)\text{Y-105} - 13.3$$

If $\frac{d^2E}{dt^2}$ is selected as the basis for comparison,

then $(t_x)\text{Y-103} = 1.24(t_x)\text{Y-104} - 21.0$

and $(t_x)\text{Y-103} = 1.23(t_x)\text{Y-105} - 11.8$

[5] National Bureau of Standards, private communications.

Table 1. Strain and Modulus Data for GR-I (Y-103, Y-104, and Y-105)

Compound	Strain Data* Y-103	Strain Data* Y-104	Strain Data* Y-105
t_o (min.)	1.9	18.5	....
	1.2	....	10.5
$k \times 10^6$ $(\text{min} \times \%)^{-1}$	399	757	....
	350	...	666
E_∞ (%)	132	120	....
	123	....	120

*Elongations were determined for specimens under load of 100 lb./sq. in.

Min. Cured at 295° F.	400% Modulus (Lb/Sq. In.) Y-103	Y-104	Y-105
20	723	851	....
40	1055	1240	....
80	1388	1584	....
20	700	....	830
40	1090	....	1220
80	1420	....	1580

Now for different assumed values of (t_x)Y-103, corresponding values of (t_x)Y-104 and (t_x)Y-105 may be computed, as indicated in the following table; the results are plotted in Figure 3.

Table 2. Times of Equivalent Cure

Criterion	$\frac{dE}{dt}$ (Equation 1) Y-103	Y-104	Y-105	$\frac{d^2E}{dt^2}$ (Equation 2) Y-103	Y-104	Y-105
	0	17.1	9.6	0	16.9	9.6
	20	31.6	24.1	20	33.1	25.9
	40	46.1	38.6	40	49.2	42.1
	60	60.6	53.1	60	65.3	58.4
	80	75.1	67.5	80	81.5	74.6
Identical times of	59.6	59.6	....	87.5	87.5	....
equivalent cure	35	....	35	51.3	....	51.3

If 40 minutes is selected as the desired curing time for Y-103, then equivalent cures of Y-104 and Y-105 would be attained at 46 and 39 minutes based on the same value of $\frac{dE}{dt}$ or at 49 and 42 minutes if based on the value of $\frac{d^2E}{dt^2}$.

A quantitative idea of the rate at which elongation changes per minute of curing time and the acceleration of this rate at different times of cure may be obtained from the following values based on data for X-539 GR-S.

Table 3. Change in Elongation and Rate of Change of Elongation (X-539 GR-S)

Time of Cure, Min.	Change in % Elongation Units/Min. $\left(\frac{dE}{dt}\right)$	Acceleration in % Elongation Units/Min./Min. $\left(\frac{d^2E}{dt^2}\right)$
25	8.24	0.817
44	2.19	0.112
50	1.64	0.073
100	0.37	0.008

Values for 44 minutes are included because this period was selected, by a method used at the Government Laboratories, as the preferred time of cure for this polymer in the recipe given in the "Specifications for Government Synthetic Rubbers."

Equations 1 and 2 for $\frac{dE}{dt}$ and $\frac{d^2E}{dt^2}$ may be transposed into another form. If definite values, V_1 and V_2, are selected as the criteria of proper cure for some standard compound,

$$V_1 = \frac{\frac{1}{k}}{(t_x - t_o)^2} \tag{4}$$

$$\text{and } V_2 = \frac{2\left[\frac{1}{k}\right]}{(t_x - t_o)^3} \tag{5}$$

$$\text{whence } t_x = t_o + \sqrt{\frac{1}{k} \div V_1}$$

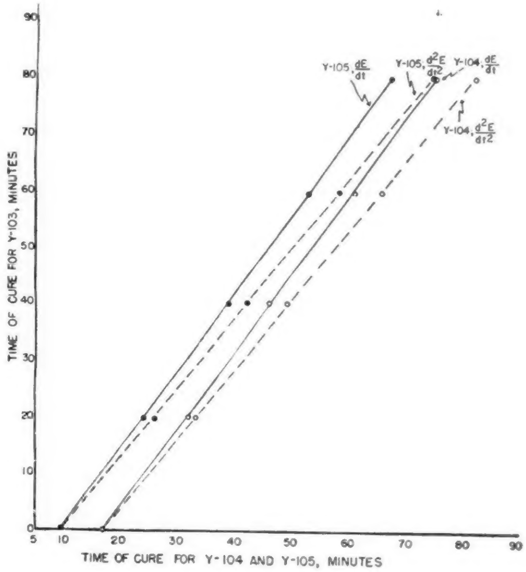


Fig. 3. Relative Times for Equivalent Cure

$$\text{i.e., } t_x = t_o + F_1 \sqrt{\frac{1}{k}}, \text{ where } F_1 = \sqrt{\frac{1}{V_1}} \tag{6}$$

$$\text{or } t_x = t_o + \sqrt[3]{2\left[\frac{1}{k}\right] \div V_2}$$

$$\text{i.e., } t_x = t_o + F_2 \sqrt[3]{\frac{1}{k}}, \text{ where } F_2 = \sqrt[3]{\frac{2}{V_2}} \tag{7}$$

The average values for t_o (4.83) and $\frac{1}{k}$ (3352.89) for X-539 GR-S[6] were inserted in these equations with 44 minutes as to the preferred cure, t_p; viz.:

$$44 = 4.83 + F_1\sqrt{3352.89} \quad \text{and } F_1 = 0.68$$

$$\text{and } 44 = 4.83 + F_2\sqrt[3]{3352.89} \quad \text{and } F_2 = 2.61$$

$$\text{That is, } t_p = t_o + 0.68\sqrt{\frac{1}{k}}$$

$$\text{or } t_p = t_o + 2.61\sqrt[3]{\frac{1}{k}}$$

On the basis of this mathematical treatment confusion in the meaning of the following terms relating to curing may be avoided.

[6] Office of Rubber Reserve, private communication.

TABLE 5. EQUIVALENT CURES, VARIOUS CARBON BLACKS, VARYING ACCELERATOR CONTENT, X-558 GR-S

	t_o (Min.)				E_∞ (%)			
Accelerator*	0.5	0.6	0.7	0.8	0.5	0.6	0.7	0.8
Philblack A	12.98	10.64	10.0	12.5	142.5	120.8	112.4	106
Philblack O	10.3	5.6	4.22	6.25	156.6	131.4	125.9	118
Pelletex	11.11	8.65	15.04	15.6	188.0	161.9	166.5	162.1
Statex 93	15.2	9.0	11.4	11.8	186.1	158.0	152.5	145.5

	$\sqrt{\frac{1}{k}}$				Calculated t_p (Min.)			
Accelerator*	0.5	0.6	0.7	0.8	0.5	0.6	0.7	0.8
Philblack A	43.3	35.6	29.4	22.9	42	35	30	28
Philblack O	54.7	50.1	44.9	36.2	47	40	35	31
Pelletex	58.8	50.6	29.9	24.1	51	43	35	32
Statex 93	55.9	54.0	40.3	31.8	53	46	39	33

*Amount expressed in parts per 400 parts of polymer.

a. *Rate of cure* at any specified time is the rate of decrease in elongation per minute of cure. The time at which the rate is measured must be specified just as the percentage elongation at which a modulus value is determined is now stated.

b. *Times for equal cure* are the curing intervals required to develop in compounds the same value of the chosen criterion, $\frac{dE}{dt}$ or $\frac{d^2E}{dt^2}$.

c. Different compounds are at the same *state of cure* at identical values of $\frac{dE}{dt}$ or $\frac{d^2E}{dt^2}$, depending on the criterion used. Except when several cures of the same compound are compared, stress-strain properties are not a valid criterion for judging state of cure.

The following two investigations illustrate the possibility of utilizing mathematical analysis:

1. How uniform are the times for preferred cure, t_p, from bale to bale of GR-S?

According to a National Bureau of Standards report,[7] 30 bales of X-539 GR-S yielded t_o values varying from 1.1 to 11.7 and $\frac{1}{k}$ values from 2611 to 4367. Yet the calculated times for equivalent cure, based on 44 minutes as standard determined at Government Laboratories, were:

TABLE 4. EQUIVALENT CURE—BALES X-539 GR-S

No. of Bales	Time for Equivalent Cure t_p, Min.
Standard*	44
1	42
1	43
4	44
9	45
9	46
3	47
2	48
1	49
Total 30	Weighted average 45.5

*Based on F_1 = 0.68, Akron Government Laboratories.

It will be noted that 60% of the bales fell at 45 or 46 minutes and 83% within the range 43 to 47 minutes, indicating excellent uniformity. The standard deviation is 0.27.

2. Another analysis consisted in comparing relative times for equal cures for compounds of four kinds of carbon black with various amounts of tetramethyl thiuram disulfide accelerator.[6] All recipes contained 400 parts of polymer X-558 GR-S, 200 parts of carbon black, 20 of zinc oxide, 8 of sulfur, and 6 of stearic acid. Various proportions of accelerator were used with each black. Pertinent data appear in Table 5.

The preferred cures, t_p, were computed according to the formula $t_p = t_o + 0.68 \sqrt{\frac{1}{k}}$.

It will be observed that, in general, the times for equivalent cure increased according to the type of black from Philblack A, through Philblack 0 and Pelletex, to Statex 93 for all concentrations of accelerator. As might be expected, increase in the accelerator content shortened the time for preferred cure with all blacks.

By this method of comparison, the relative periods calculated by all investigators will be the same and not subject to differences introduced by varying skills of compounders in judging the significance of data on the basis of experience or of manual examination of test strips.

Unfortunately, negative values of t_o appear for certain compounds, and, in such cases, computations similar to those presented here often fail to yield rational results. For the present, therefore, only cases involving positive values of t_o should be considered. The cause and the significance of negative values need to be clearly understood before they may be logically applied.

This mathematical method of relating cures of different compounds is submitted in the hope that compounders will apply the principles presented and report as to the validity of $\frac{dE}{dt}$ and $\frac{d^2E}{dt^2}$ as criteria for comparing cures. It is hoped that one of these will satisfy the need of an accurate, duplicable method of calculation which will give reliable values without requiring a technician's judgment and experience for their selection.

Summary and Conclusions

Equations relating time of cure and elongation of rubber compounds held under a fixed load enable compounders to calculate the rate of change of elongation for any time of cure $\left[\frac{dE}{dt}\right]$ and the corresponding acceleration of the rate of change $\left[\frac{d^2E}{dt^2}\right]$. It also becomes possible to calculate times of equivalent cure of different compounds by equations relating time of cure with these two criteria. Equations are presented and illustrations of their utility are included. From one set of elongation values, only one value for time of equivalent cure can be obtained for each equation. Differences in selected times of cure, based on varying judgment of the significance of physical data, are avoided.

[7] General Tire & Rubber Co., private communication

"Indonex Plasticizers in GR-S Camelback." Circular No. 13-42, September 15, 1950. Indoil Chemical Co., 910 S. Michigan Ave., Chicago 80, Ill. 4 pages. By means of formulations and test data, Indonex plasticizers are shown to be suitable for preserving the building properties and tensile properties of GR-S camelback stocks throughout long aging periods prior to vulcanization.

Calenders for Rubber and Plastics

E. H. Johnson[1]

CALENDERS are used throughout the rubber and the plastics industries for the purpose of producing uniform sheets or continuous sheeting, coating and frictioning of fabrics from a solid mass of rubber or plastic compounds. For rubber these operations are preparatory to subsequent operations, since rubber requires vulcanization to produce a usable and salable product. Nevertheless thickness or gage of film or deposition of stock is very important. For example, the tire calender, which double-coats cord fabric at high speeds, consumes many pounds of stock per hour, and any variation in deposition of material amounts to a considerable loss in dollars over a period of time.

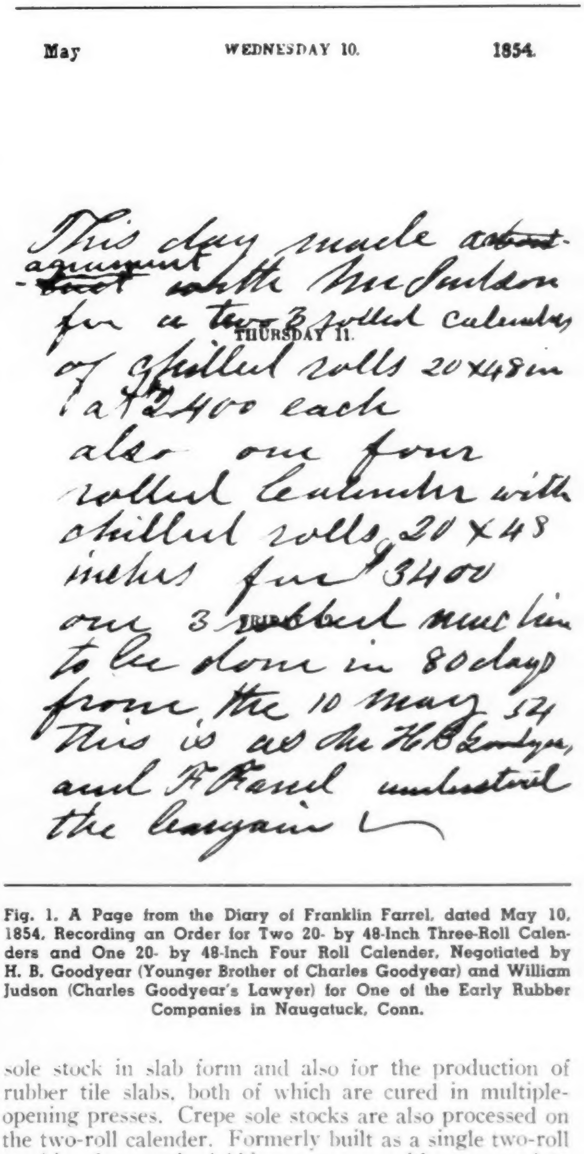
For plastic sheeting, however, a calender must produce the finished sheet or film in salable form as regards appearance, feel to hand, "lay-flatness," uniformity of thickness, and quality.

Calendering is not an exact science. The calender operator must understand the characteristics of the compound being processed and must rely to a great extent on his judgment and experience. New compounds require experimentation before being processed on a volume basis in production. Compound temperatures before calendering and roll temperatures during calendering are of the utmost importance.

Calenders for Processing Rubber

It may be interesting at this time to review briefly the history of the rubber calender. History records that the first calender was of the four-roll vertical type and was invented by Edwin Chaffee, who was a coworker of Charles Goodyear. Mr. Goodyear discovered vulcanization in 1839. The calender was used for mixing rubber compounds as well as for coating and frictioning fabrics. It can be assumed that previous to the building of the above calender, fabrics were coated by knife with the rubber in solution.

Records in the possession of Farrel-Birmingham Co. show that in the year 1854 one of the early rubber companies which sprang up after the discovery of vulcanization by Charles Goodyear purchased from Farrel Foundry & Machine Co. three calenders for processing rubber. (See Figure 1.)


May WEDNESDAY 10. 1854.

This day made ~~contract~~ agreement with Mr Judson for a two 3 rolled calendar of chilled rolls 20x48 in at $2400 each also one four rolled calender with chilled rolls 20 x 48 inches for $3400 one 3 rubbed machine to be done in 80 days from the 10 may 54 This is as Mr H B Goodyear and F Farrel understood the bargain

THURSDAY 11.

Fig. 1. A Page from the Diary of Franklin Farrel, dated May 10, 1854, Recording an Order for Two 20- by 48-Inch Three-Roll Calenders and One 20- by 48-Inch Four Roll Calender, Negotiated by H. B. Goodyear (Younger Brother of Charles Goodyear) and William Judson (Charles Goodyear's Lawyer) for One of the Early Rubber Companies in Naugatuck, Conn.

Since footwear was one of the first useful articles made of rubber, it was logical that this branch of the industry should be the first to demand better equipment for meeting its processing and manufacturing problems. Farrel-Birmingham Co. and its predecessors, Farrel Foundry & Machine Co. and Birmingham Iron Foundry, pioneered in the development of designs of calenders from the earliest inception of the industry. The accompanying diagrams (Figure 2) illustrate the various roll arrangements of calenders built by these companies, now in operation in this country. These are listed under the industry in which they are used. Each arrangement has its own peculiarities for speed, surface friction, roll temperature, roll contour, and product requirements.

Two-Roll Calender, Vertical or Inclined

The two-roll calender is limited to a single pass for processing the compound from the form of a mass to a finished sheet or slab. It is used for the production of sole stock in slab form and also for the production of rubber tile slabs, both of which are cured in multiple-opening presses. Crepe sole stocks are also processed on the two-roll calender. Formerly built as a single two-roll machine for rough slabbing purposes without regard to accuracy, this type calender has been developed to a high degree of efficiency, by the removal of all gears from the rolls; the use of flood-lubricated roll neck bearings; positioning of the top roll to remove tendency to float, and by the use of drilled rolls for the quick dissipation of heat generated by heavily loaded compounds. The drilled roll, when refrigerated, is ideal for chilling the surface of mottled floor tile stocks, thereby eliminating color blending and giving character to the color pattern. It may be of interest to the rubber industry that this calender is widely used by linoleum manufacturers for the production of all-over marble color pattern flooring. It is also standard for the asphalt tile producers. Figure 3 shows a two-

[1] Executive engineer, rubber and plastics machinery division, Farrel-Birmingham Co., Inc., Ansonia, Conn.

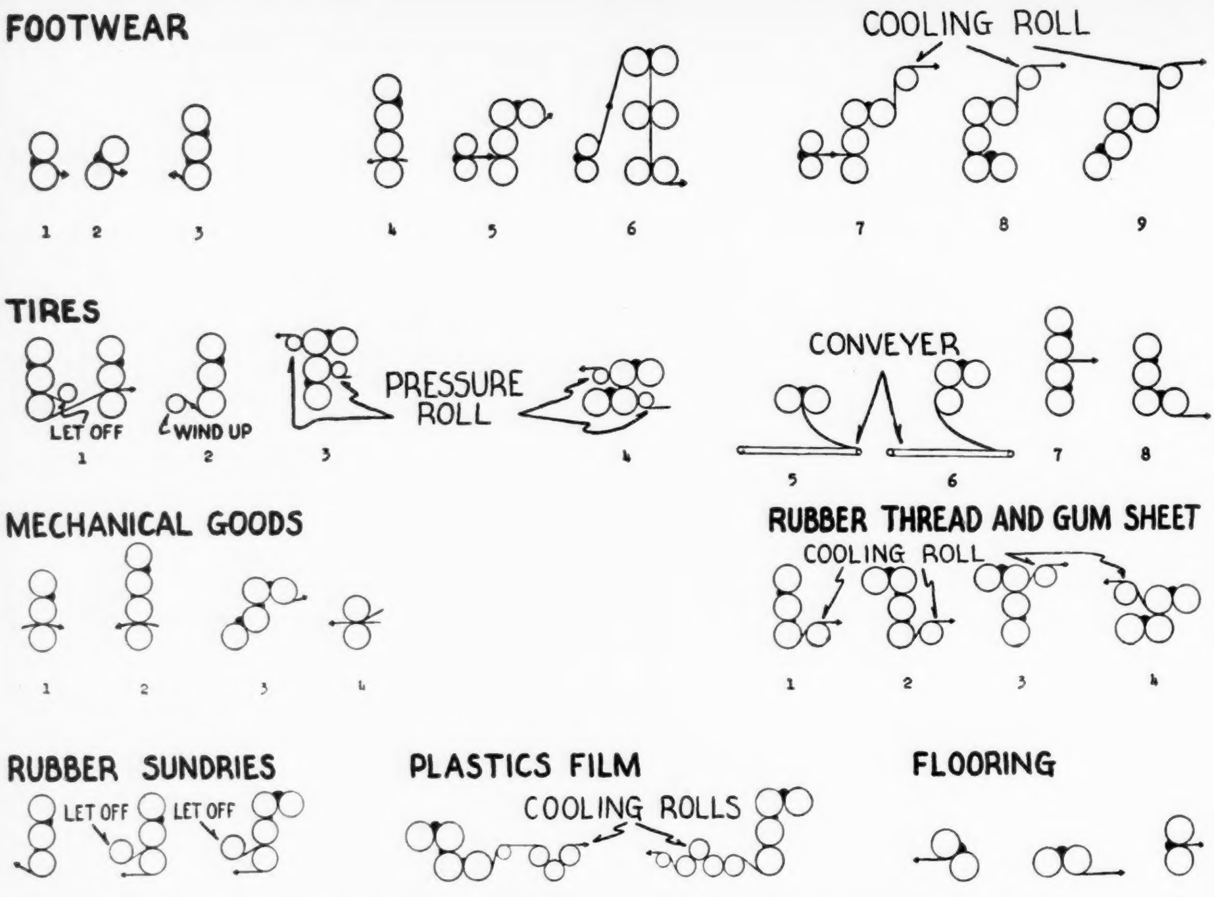


Fig. 2. Schematic Diagrams of Roll Arrangements for Various Calenders Used in the Major Branches of Rubber and Plastics Industries

FOOTWEAR: 1. Two-Roll Vertical for Sole Slabs. 2. Two-Roll Inclined for Sole Slabs. 3. Three-Roll Vertical Utility. 4. Four-Roll Vertical for Coating. 5. Two-Roll Slab and Four-Roll Inverted L for Sole Stock. 6. Two-Roll Slab and Horizontal Pairs in Vertical Arrangement for Sole Stock. 7. Two-Roll Slab and Four-Roll Inverted L with Roll Cooling for Upper Stock. 8. Five-Roll with Cooling Roll for Upper Stock. 9. Four-Roll Camel-Back with Cooling Roll for Upper Stock

TIRES: 1. Pair of Vertical Three-Roll for Double Coating. 2. Three-Roll Vertical Utility. 3. Four-Roll Inverted L and Pressure Rolls for Double Coating. 4. Four-Roll Z and Pressure Rolls for Double Coating 5. Two-Roll Horizontal for Gum Strip. 6. Three-Roll Inverted L for Gum Strip. 7 Four-Roll Vertical for Gum Strip. 8. Four-Roll L for Tread Stock

MECHANICAL GOODS: 1. Three-Roll Vertical Utility. 2. Four-Roll Vertical for Coating. 3. Four-Roll Camel-Back for Mat Stock. 4. Two-Roll Vertical for Belt Making

RUBBER THREAD AND GUM SHEET. 1. Three-Roll Vertical and Cooling Roll for Single Sheet. 2. Four-Roll Inverted L and Cooling Roll for Single Sheet. 3. Four-Roll Inverted L and Cooling Roll for Double Sheet. 4. Four Roll Z and Cooling Roll for Double Sheet

RUBBER SUNDRIES: 1. Three-Roll Vertical Utility. 2. Three-Roll Vertical and Let-off for Tape. 3. Four-Roll Inverted L and Let-off for Tape

PLASTICS FILM: 1. Four-Roll Z with Cooling Rolls. 2. Four-Roll Inverted L with Cooling Rolls

FLOORING: 1. Two-Roll Inclined for Linoleum and Rubber. 2. Two-Roll Horizontal for Linoleum. 3. Two-Roll Vertical for Asphalt Tile

Fig. 3. Two-Roll Vertical Calender, 30- by 54-Inch Rolls, with Flood Lubricated, Precision Sleeve Bearings, Hydraulic Positioner for Top Roll, Drilled-Type Rolls, and All Gearing Enclosed in a Separate Uni-Drive Connected to the Rolls by Universal Spindles

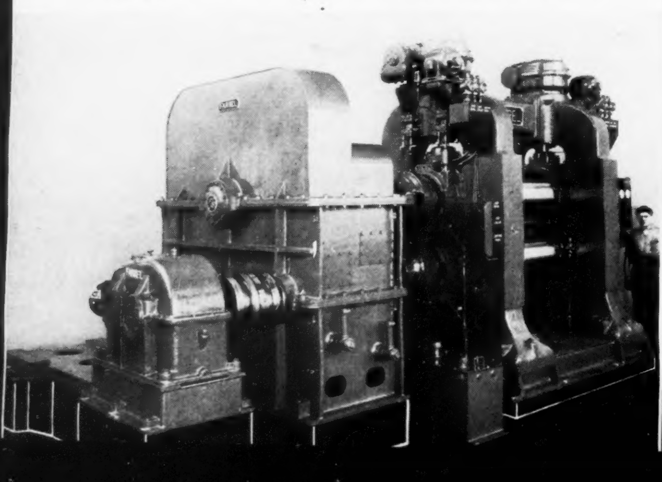
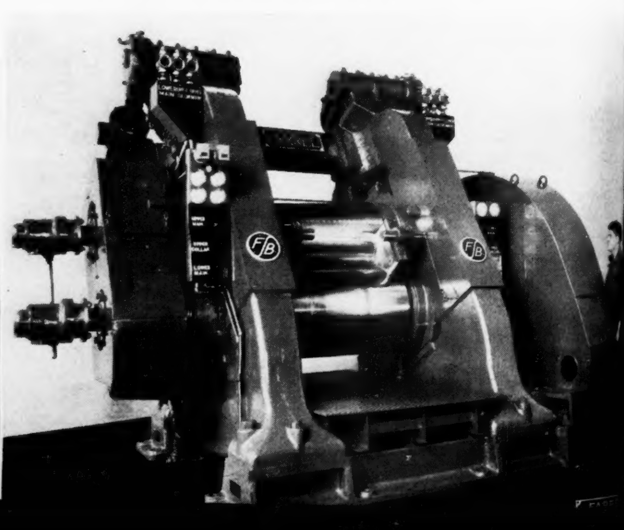


Fig. 4. Two-Roll Inclined Calender, 30- by 48-Inch Rolls, Used for Linoleum or Floor Tile of Rubber or Asphalt. The Rolls Are Tilted to Facilitate Feeding



roll vertical calender, and Figure 4 a two-roll inclined calender.

Three-Roll Calender

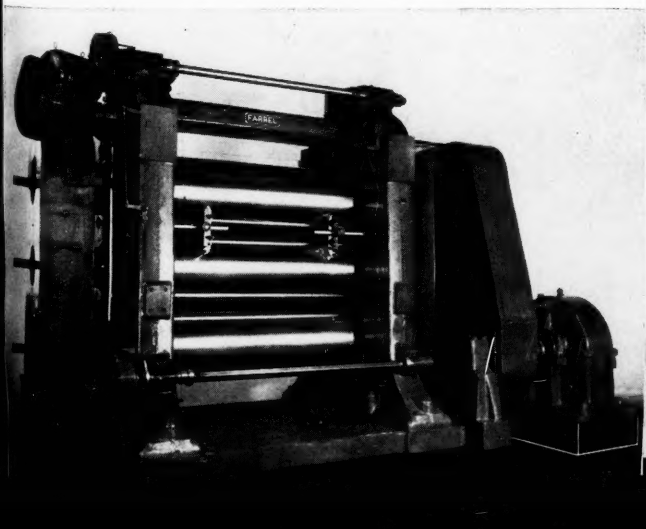
The three-roll calender, complete with even and friction-motion connecting gears, is the most common variety in operation in rubber plants. It has been built with practically all sizes of rolls from 6 by 12 inches to 32 by 105 inches. Because it is so common, nearly every plant has at least one that has been used for processing every conceivable type of material. It has been used as a two-roll calender, with the ever-present hazard of breaking the bottom half of the middle-drive roll bearing, or breaking off the lugs of the housing which support the bearing. The three-roll calender is designed for double-pass operation, with loadings at top and bottom bites. These loadings, or separating forces, vary with the size of the banks, temperature of the rolls and stocks, and also with the viscosity of the stocks. In most cases the separating force at the top or bank pass is much greater than at the bottom finishing, coating, or frictioning pass. The top roll is always ground to compensate for deflection, and the bottom roll may have a crown or concavity, depending upon the degree of loading at the bottom pass. The drive or middle roll is always ground straight, without contour.

Since all three rolls are superimposed, one above the other, in line, it is clear that any change in degree of loading at the top pass has a direct effect upon the loading at the bottom pass. In other words, any fluctuation in loading at the top pass affects the pressure at the bottom pass, resulting in a change of the gage of the material being sheeted, coated, or frictioned. Balanced loadings, top and bottom, are extremely difficult to control; the least troublesome calender is one with a heavy loading at the top and a very light loading at the bottom.

Roll neck bearings, whether ball, roller, or sleeve type, require sufficient clearance for maximum roll neck expansion due to heating and also for oil film formation. Under normal operating conditions this clearance is greater than required and is a handicap to the operator trying to control the position of the rolls. So-called zero clearance devices, consisting of small hydraulic pressure cylinders and bearings, have been installed between the rolls in an effort to stabilize or eliminate the float of the middle or drive roll. This device, however, has been of little value because, in most cases, it must resist a roll separating force of such magnitude that its effect is nullified.

The three-roll calender under known fixed conditions of uniform strip feed, speed, loadings, etc., and with skillful operation has given a fair account of itself over a period of many years. Figure 5 shows a three-roll rubber calender.

Fig. 5. Three-Roll Rubber Calender, 24- by 68-Inch Rolls



Four-Roll Calenders, Vertical, Inverted L-Type, and Z

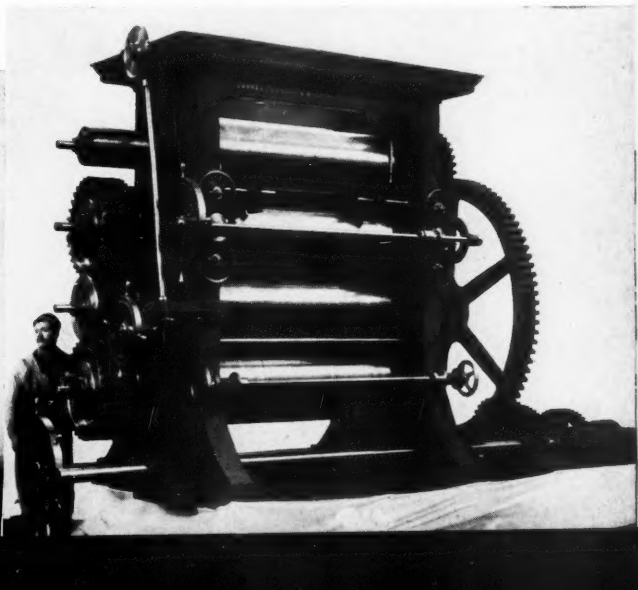
VERTICAL TYPE. Early processors of rubber for coating and frictioning of fabrics for weatherproofing and footwear stocks realized that a much better product could be made by the proper conditioning of the compound before application to the fabric, and that the conditioning should be done on the calender. The compound is limited to one conditioning pass on the three-roll calender; whereas it would have two conditioning passes on the four-roll calender, and the second pass should be a so-called pencil bank for metering the desired amount on to the fabric. This realization brought forth the four-roll calender. Many of these calenders built between 1880 and 1910 are still in operation in this country and abroad.

The four-roll calender with a fourth roll added to the top of a three-roll calender brought forth problems in design of roll adjustment, roll frictions, and roll contours. The problems involved in the operation of the three-roll calender were increased by the addition of one more pressure bank and its effect on other roll banks in the stack. The #1 or top roll was adjusted by the conventional mechanism, consisting of screws and worm gears with cross-shafting. The #2 roll was adjusted by compensating wedges supported by the calender housing, and the position of this roll could not be changed without first moving the #1 roll. Later the wedges were mechanically tied together by connecting gearing and shaft so that the adjustment could be made from the common handwheel. However backlash, due to wear in the moving parts, caused the wedges to bind or lock in position and fail to function. Satisfactory production from this type of calender was due largely to the skill of the operator. Figure 6 is an early four-roll calender with wedge adjustment.

Later the wedge design of adjustment was replaced by the Midgley patent type of adjustment, where the two top rolls are supported in a sliding cage, and dual motorized roll adjustments permit individual roll control at the will of the operator. Figure 7 illustrates such a four-roll calender with the Midgley adjustment.

INVERTED L-TYPE CALENDER. Although small inverted L-type calenders were in operation for many years by footwear manufacturers for the production of embossed sole and upper stocks, it was not until 1924 that a large calender of this type was built. The development of the cord tire carcass, consisting of individual gum-dipped cords or threads, laid side by side without wefts or picks, required a calender that would coat each side with a gum sheet simultaneously in a single operation. Three-roll

Fig. 6. An Early Four-Roll Rubber Calender with Cornice-Type Housing and Wedge Adjustment for #2 Roll



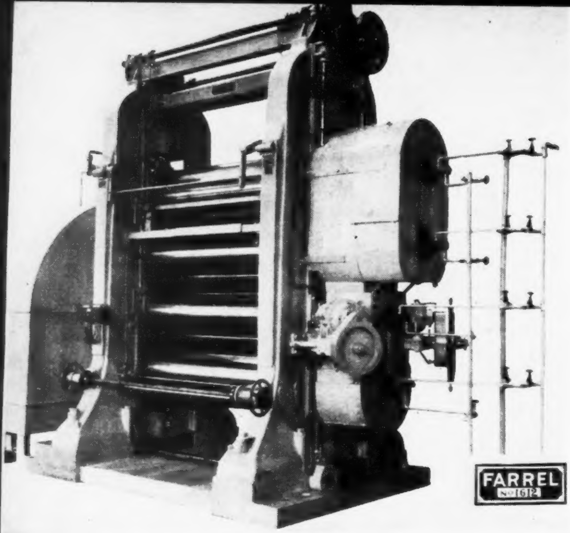


Fig. 7. Four-Roll Vertical Calender with Midgley Patent Adjustment. The Two Upper Rolls Are Mounted in a Separate Cage within the Calender Frame; so the Settings for Passes 1 and 2 Can Be Separately Adjusted without Affecting Each Other

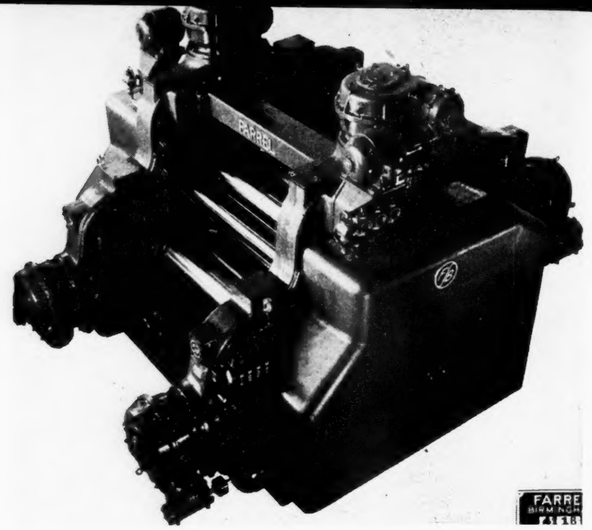


Fig. 10. Four-Roll Z-Type Calender for Double-Coating Tire Cord. This Calender has 28- by 70-Inch Rolls, Flood-Lubricated Bearings, Crossed-Axes Mechanisms for Both Upper and Lower Roll Pairs, and Pressure Rolls against Top and Bottom Rolls

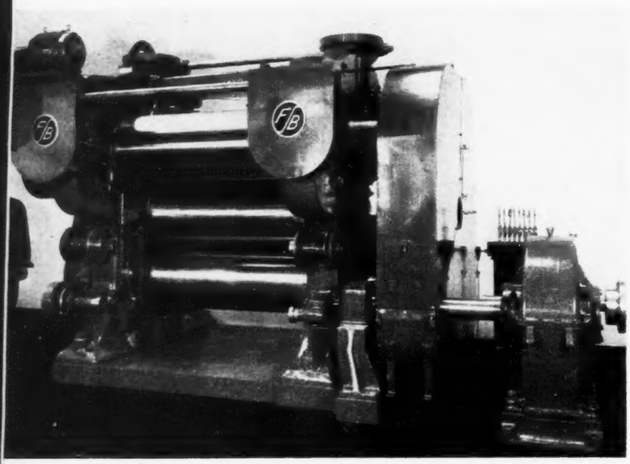
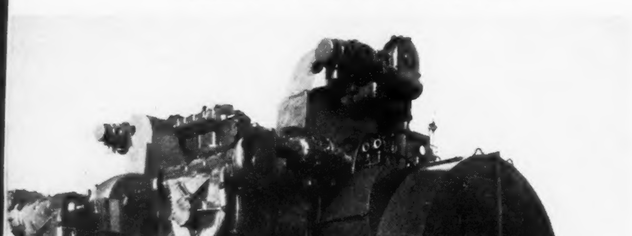


Fig. 8. Four-Roll Inverted L-Type Rubber Calender with 24- by 68-Inch Rolls

Fig. 9. Four-Roll Inverted L-Type Calender with 32- by 70-Inch Rolls, Flood-Lubricated Journal Boxes, and Individual Motor Adjustment for Each Roll Adjusting Screw. At the Left Is a Laboratory Calender of the Same Type with 8- by 16-Inch Rolls and with the Motor Drive Enclosed in a High Base



calenders, with 24- by 68-inch rolls, were converted into four-roll calenders with two bank passes, each producing a sheet which is applied to the incoming cords, one on one side and one on the other, on the third pass of the calender. New calenders were designed for this specific operation with roll proportions of 24 by 68 inches, 28 by 78 inches, or 32 by 70 inches. Figure 8 shows a four-roll inverted L-type rubber calender. However, here again we have the three-roll stack with a heavy bank pass at the bottom and a light laminating pass at the top, and any change in the position of the top roll, such as passage of a seam, caused a change in the position of the middle roll and also the gage of the gum sheet from the bottom pass. Skill is necessary to reset the rolls quickly to operating position without undue loss of material due to uneven deposition and weight. Figure 9 shows a 32- by 70-inch four-roll inverted L calender in comparison with an 8 by 16 calender of the same type.

Z-Type Calender. The excellent performance and the experience gained from the Z-type calender producing plastic film, at high speed, are responsible for the application of this arrangement of rolls for the calendering of rubber compounds. A calender of this design is now in operation producing gum sheeting, single and laminated, for cut rubber thread. Another calender has been installed in a tire plant for double-coating cord tire fabric. All four rolls are positioned hydraulically in the direction of each separating force, and the direction of each separating force is at right angles to the succeeding one. There are no opposing separating forces, as is basic with the three-roll stack. Each side roll is equipped with a crossed-axes device for compensating for a change in roll deflection when calendering a different gage or compound or at a different roll speed. Additional information regarding engineering and construction details are covered under the heading of "Calenders for Plastics." Figure 10 illustrates a four-roll Z-type calender used for double-coating tire cord.

Calenders for Plastics

It is logical that during the development of the process of calendering plastic film, calenders designed and built for rubber were purchased, second-hand, and used for experimental purposes. It quickly developed, because of the elevated roll temperatures required for processing plastics, that the open-type roll neck bearings, which had given satisfactory service for many years for processing

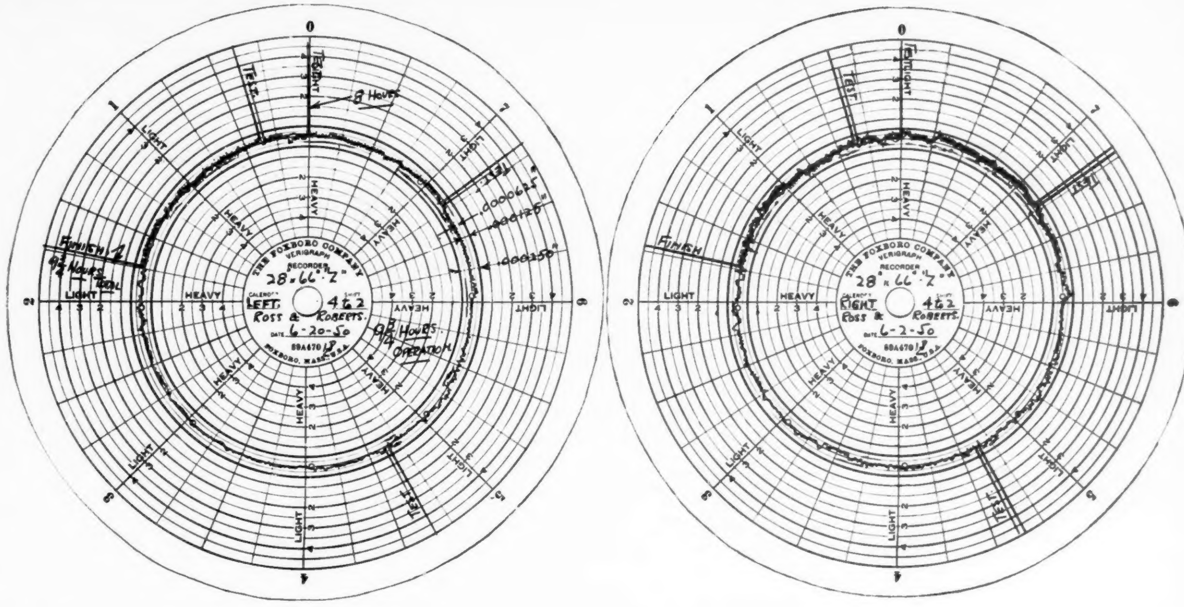


Fig. 11. Verigraph Charts Showing the Extreme Accuracy of gage (±0.0001-Inch or Less) That May Be Obtained in the Calendering of Vinyl Film (Courtesy of Ross & Roberts, Inc.) The Zero on These Charts Represents the Gage Being Run Whether It Be 0.002, 0.004, 0.005, etc. of an Inch. They Are Plus or Minus Charts with the Limits (Heavy Lines) about the Recorded Gage Representing 0.00025-Inch

rubber, were not suitable for hot operation. Permissible lubrication was insufficient and resulted in seized bearings, scored roll journals, and high maintenance costs. Engineering investigation of the requirements dictated that bearings must be supplied with an ample supply of oil at a controlled temperature in order to assure continuous, uninterrupted operation.

The flood-lubricated sealed-type bearing, which had already been designed and used for mills for the hot processing of cellulose acetate and phenolic resins, was then adapted to calenders.

It was realized, very early in the development of film processing, that because the operation was of a hot nature, it was essential that proper conditioning of the plastic be done on the calender before the final gaging or finishing pass. The four-roll inverted L calender, already in operation in other industries, was redesigned for the specific purpose of processing film. The fluctuating bank pass at the top was at right angles to the two succeeding "pencil" bank passes in the vertical stack, giving a total of three passes. The two bank passes, with proper feed from the mill to the calender, have been found to be sufficient to condition the plastics for the final gaging or finishing pass.

Many three-roll calenders, after years of service in rubber plants, have been used for film production, but these have been gradually replaced by new four-roll calenders of the inverted L or Z type.

Complaints from the users of the inverted L calender regarding the difficulty of adjusting the setting or positioning of the rolls in relation to each other because of roll float brought about engineering consideration to overcome the problem. The design and the application of the zero clearance devices to the calender were done for the purpose of improving this condition. However, as heretofore mentioned, the application was not very successful. Also, the application of tapered roller bearings to the roll necks was for the sole purpose of preloading the bearing for the elimination of all shake or float. Experience has proved that the tapered roller bearing operating under these conditions at high temperature is in

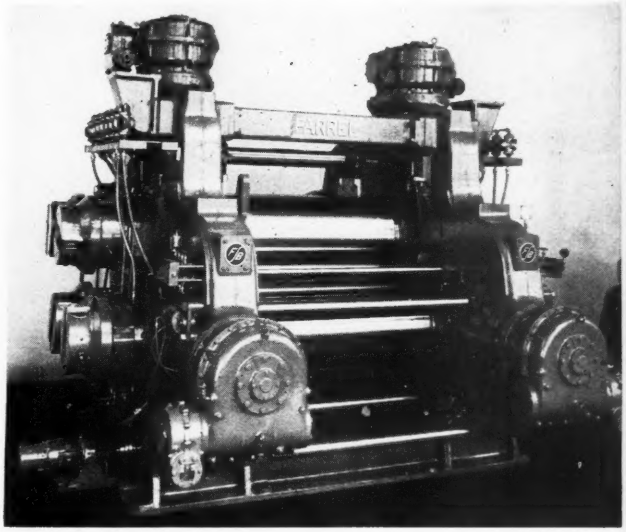
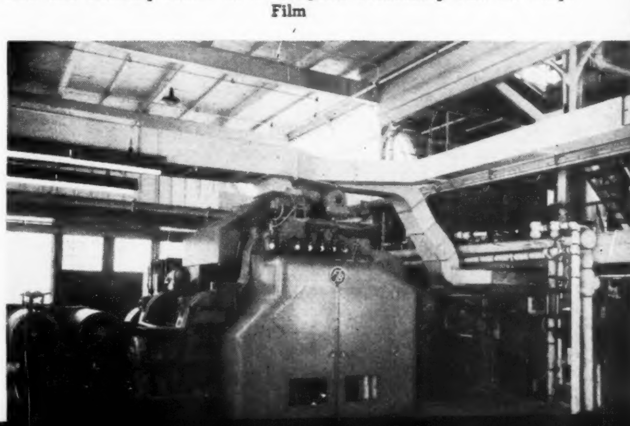


Fig. 12. Four-Roll, Z-Type, Plastic Calender with Rolls 28- by 66-Inches, Showing Universal Coupling Hubs on Roll Ends for Connecting the Rolls with the Drive and Connecting Gears Which Are Enclosed in a Separate Unit

Fig. 13. An Example of a Proper Installation of a Z-Type, Four-Roll Calender, with 28- by 66-Inch Rolls, in the Plant of Ross & Roberts, Inc., Stratford, Conn. This Installation Includes a Feeding Mill and Banbury Mixer for a Complete Processing Unit for Vinyl Film



danger of failure because of surface breakdown of races and rollers. Roller bearings are operating successfully, however, on plastics calenders with predetermined clearances permitting very light, if any, preloading.

The sleeve bearing, when properly designed and lubricated, is easy to install, much less expensive, and will give continuous precision performance over a long period of time, as the only variable in its operation is the thickness of the oil film; and this can be controlled by controlling the oil temperature. Sleeve bearings permit the use of larger journals, thus giving more stiffness and strength to the roll.

The Z arrangement of rolls was also designed to overcome the problem of roll float. Each separating force is resisted by the rolls acting as two rotating beams, which are positioned hydraulically in the clearance of the bearings, in the direction of the forces. This set-up permits adjustment of any of the three passes without affecting the others. The only remaining variables are the thickness of the oil film and the stretch of the frames. The oil film can be controlled accurately by flow and temperature, and the frames are proportioned and so designed that stretch or elongation is negligible.

The Z arrangement of rolls in a calender is also considered much safer to operate for high-speed film production because the rolls are free to deflect away from each other if they should expand very rapidly in diameter owing to loss of temperature control. For example, a roll of 28-inches in diameter will expand or contract approximately 0.0015-inch for each 10° F. temperature change. Rolls for processing vinyl film are operated at surface temperatures ranging from 320 to 350° F., with an expansion of approximately 0.0375- to 0.042-inch for the 28-inch diameter.

The Z arrangement of rolls has been very successful in producing film of highly accurate gage, as evidenced by the charts recorded by the Foxboro Verigraph at the Ross & Roberts Co. plant at Stratford, Conn. See Figure 11. In Figure 12 is illustrated a four-roll Z-type plastics calender.

In the brief span of ten years, which is a relatively short time in the life of any process, the speed of plastics calenders has been increased from 30 yards a minute to approximately 100 yards a minute, with the limiting factor being one of the proper formulation of the vinyl compound for such high-speed calendering. This accomplishment is remarkable when we consider that films 0.002-inch to 0.004-inch gage, 54 inches in width, are calendered at this high speed with a thickness variation of less than plus or minus 0.0001-inch. This has been done by operators without the benefit of previous experience in the operation of calenders for rubber. It is reasonable to expect that the speeds will be further increased with the development of improved resin formulation and the design of suitable film cooling and handling equipment.

Design Considerations—Plastic Film Calenders

The principal factors involved in the design of calenders for the production of plastic film at high speeds are listed as follows:

1. The rolls must be arranged and positioned so that each roll can be adjusted individually without affecting the position of the others.
2. The "drilled"-type roll is essential for the removal of heat generated by the molecular action of the vinyl compound. The rolls must be completely machined inside and outside, and the bodies must be concentric with the necks or journals. The surfaces of the roll must be free from imperfections and ground with the proper contours to compensate for deflection and heat dissipation.
3. Hot water in constant circulation is the medium used for heating and cooling the rolls over the entire speed range. The temperature of each roll must be adjusted separately and maintained automatically.
4. The crossed-axes device, designed and developed as a means for adjustment for a change in roll deflection at the final gaging pass, has proved to be invaluable and an essential part of the design of the film calender. Its effect has been increased by the development of the device so that, today, instead of being used for "tuning" or "trimming" in gage correction only, it is now effective over a considerable range of gages.
5. All the gears are removed from the rolls and mounted in a separate, fully enclosed, flood-lubricated gear unit. The drive shafts of the gear unit are connected to the rolls by flexible universal joints. This construction is for the purpose of eliminating connecting gear transverse loads, which preclude accurate positioning of the rolls in their journals.
6. The roll neck bearings must be precision built, of the water-cooled, flood-lubricated type, equipped with metallic seals for preventing the loss or leakage of warm or hot oil in circulation.
7. Two-speed motors, one for each adjusting screw, are used for moving or adjusting the position of the rolls in the calender frames. The slow speed is used for accurate roll positioning, and the high speed, which is five times as fast as the slow speed, is used for rapid adjustment purposes. The power is transmitted by precision-built double-worm gear units. Operation is by selective push-button control.

Installation Precautions

Due consideration must be given to the location of the calender in the plant so that it is not affected by atmospheric changes. It should be erected by expert mechanics familiar with this type of equipment and its operation, and a "running in" period is specified so that bearings, gears, oil flow and temperature control can be checked before actual processing is started. Figure 13 shows the installation of a Farrel-Birmingham Z-type, four-roll calender, together with feeding mill and Banbury mixer, which is used for the production of vinyl film at the Ross & Roberts, Inc., plant.

Belt Conveyer Moves a Mountain

The task of moving a 4,000,000-ton mountain seven miles to build Bull Shoals Dam on the White River, Ark., begun two years ago, is now 90% completed. In this operation a seven-mile-long belt conveyer carries 650 tons of crushed rock an hour at the rate of 525 feet a minute. This seven-mile stretch is split into 21 flights which cross two valleys, go under three and over two roads, and cross innumerable streams. An additional three miles of conveyers are also used on the dam project itself. Because of the "one-shot" lubrication idlers, made by Robins Conveyors Division, Hewitt-Robins, Inc., of which approximately 14,000 are used, the belt requires a maintenance crew of only seven men. The belt, of standard rubber-covered cotton fabric construction, was also made in part by Hewitt-Robins.

EDITORIALS

Rubber Program Needs Full-Time Natural Rubber Specification Project

THE United States rubber industry, which through the pre-Korea Rubber Act of 1950 and the post-Korea Defense Act of 1950, continues under the control of the government for at least the next two years, needs a full-time project in connection with the development of packaging, marking, handling, cleanliness, and technical specifications for crude natural rubber.

Government and industry in the next two years will probably purchase three million or more tons of natural and synthetic rubber worth more than two billion dollars.

Are the government and the industry satisfied that they know what they are getting for their two billion dollars? With the synthetic rubber, which will cost about $700,000,000 for the two years, specifications have been established and may be expected to provide the desired information regarding the material being purchased, but with the natural rubber, which will involve at least $1,300,000 at an assumed price of 30¢ a pound, proper specifications have not been established.

The consuming industry in this country has complained vigorously since the end of the late war about the lack of cleanliness, quality, and uniformity of natural rubber. Although no great improvement has resulted, the producers of natural rubber have been working quite aggressively for the past two or three years on methods of improving the quality of their rubber, and recent reports seem to indicate that they could provide better rubber if the consuming industry would tell them specifically what was wanted.

At the present time we still have nothing but the "appearance" specifications sponsored by The Rubber Manufacturers Association, Inc., and the Rubber Trade Association of New York, the value of which for accurate evaluation in dollars and cents of a given lot of natural rubber is at least debatable.

Work on technical specifications for natural rubber has been started by the newly formed subcommittee on crude natural rubber of Committee D-11 of the American Society for Testing Materials. Work on handling, packaging, and type classifications (visual) is still carried on by the crude rubber committee of the Rubber Manufacturers Association.

The ASTM subcommittee has had only three meetings in the past year, and task groups on dirt, compound formula, mixing procedure, etc., have just begun their work. Because the members of this subcommittee can work on natural rubber specifications only on a part-time basis, recommendations may require months or even years of effort.

In view of the amount of money involved and the importance of both the military and the civilian rubber products to be made in the next two years, I think a full-time project on natural rubber specifications is an urgent necessity and should be an important part of the government rubber program.

No criticism of the D-11 subcommittee is intended, but if specifications are really desired by the consuming industry and in time to be of value during the next two years, full-time rather than part-time effort is necessary. The project should be sponsored jointly by industry and government with the RMA anl ASTM committees as consultants.

Specifications for synthetic rubber were developed jointly by government and industry with much of the work being done at the National Bureau of Standards during the war and postwar years. An article on an improved method for comparing cures of rubber compounds by James W. Schade, of the Government Evaluation Laboratories, which is based on work done as part of the synthetic rubber program is published elsewhere in this issue. This method needs further work to determine its applicability to natural rubber compounds and is cited as an example of the interrelation of work on synthetic rubber with that on natural that might be done.

Furthermore, the present chairman of the D-11 subcommittee is Norman Bekkedahl of the Bureau, and it might be that this would be the best place for the work on natural rubber specifications to be carried on.

Where the work is done is not so important as its being done as soon as possible so as to use the results of the natural rubber producers research associations reported recently before the American Chemical Society and the ASTM to best advantage by correlating them directly with the needs of the consuming industry. The determination of these specific needs is the unknown quantity which should be accomplished by intensive work in the immediate future.

Holiday Greetings

EVEN in these days of wars and rumors of wars, defense programs, allocations and controls, the staff of India RUBBER WORLD is glad that the approach of the Holiday Season permits us to pause briefly and wish our many friends in the rubber, plastics, and associated industries Best Wishes for a Very Merry Christmas and a Happy and Prosperous New Year.

All industry faces increasing problems of material supply in the coming year, but the rubber industry should be somewhat more fortunate than others in that the supply of synthetic rubber will increase rapidly during the first quarter of 1951. Natural rubber, although available in smaller amounts than in 1950 by government order, should be adequate, and if other compounding ingredients can be obtained, all will be well.

R. G. Seaman

DEPARTMENT OF PLASTICS TECHNOLOGY

Plasticizers for Vinyl Film and Sheeting[1]

M. C. Reed[2]

PLASTICIZED vinyl film and sheeting were just coming on to the market in small volume prior to World War II. The war gave considerable impetus to applications for these products, and since the war the volume of usage has risen to about 152,000,000 pounds in the last year.

This paper deals only with plasticized films and sheetings made from vinyl chloride polymers and copolymers. These resins are hard, tough products which require the incorporation of a considerable quantity of plasticizer to provide flexibility and to facilitate processing. The quantity and the type of plasticizer used vary over a wide range, but usually 40-70 parts of plasticizer are required for each 100 parts of vinyl resin. Aliphatic and aromatic esters are most commonly used as plasticizers, but various other chemical types are also employed, especially as extenders for the more common esters.

It is common in the trade to refer to thin goods 10 mils or less in thickness as film; while material over 10 mils is called sheeting. Sheeting made by coating plastic on to cloth or other backing is called supported sheeting; while that made without a reinforcing backing is called unsupported sheeting.

Film may be made by calendering, in which case no solvents are used, or by the organosol or plastisol spreading technique. Organosols are dispersions of resin particles in a liquid medium comprising plasticizer, solvent, and dispersant. Plastisols are dispersions of resin in plasticizer without volatile diluent. Organosols and plastisols remain fluid during spreading and must be subsequently heated to develop full strength and elasticity by solvating the resin particles. These methods are usually used only for films less than four mils thick and for thin coatings on cloth.

General Requirements for Film and Sheeting

Meyers[3] has listed permanence, stability, and freedom from objectionable odor as the prime requirements for a plasticizer for vinyl resins. Film and sheeting to be used in a wide variety of applications should have good permanence with respect to loss by extraction and volatilization, good light stability, good heat sealing properties, high tear strength, and freedom from objectionable odor, taste, or toxicity. Several other properties are essential to some end-uses, including a low order of temperature sensitivity, inertness to sulfur compounds, low marring tendency toward surface coatings, flame resistance, desirable appearance, and a minimum of calendering strains.

No one formulation will produce the ultimate in all of these properties. There is always the necessity of balancing one property against another and against cost to get the best product possible for the money. The result may be a commendable success for one use, but wholly inadequate for another.

Methods of Test

The hazards which beset plastic products in service are legion, and it behooves us to anticipate these and put our products through these experiences and learn what to expect. Business opportunities go to those prepared with reliable information, among other things; therefore, we must have laboratory tests, preferably accelerated, upon which we can depend to predict service behavior. Many tests have been described in the literature and in manufacturers' bulletins, and a few are very briefly recounted here. Fligor and Sumner[4] and the present author,[5] among many others, have discussed these problems elsewhere.

Compatibility is best determined by preparing the formulation desired and exposing to several temperatures and, in particular, to high humidity. Acceleration is sometimes accomplished by exposure in a Weather-Ometer with a water spray. By judiciously varying the formulation the compounder may also achieve an accelerating effect. For example, if a formulation of 100 parts resin, 30 parts primary plasticizer, and 20 parts secondary plasticizer was suspect, but did not spew in one week, it would be desirable to try 25 parts of each plasticizer. If this formulation showed no evidence of incompatibility, then the original formulation would be expected to be safe.

Testing for volatile loss presents many problems not only in obtaining consistent data from any one test, but also in interpreting the data in terms of service. The effects of time of exposure, temperature of the test, and thickness of the specimen have been evaluated by Rider and Sumner[6] and by the author.[7] In addition, air velocity is an important, but still unevaluated variable with specimens suspended in free air. The SPI recently suggested a test in which specimens are packed in activated carbon and heated for 24 hours at 70° C., or in certain instances at either 50 or 90° C. This test had produced consistent results and has drawn favorable comment from several laboratories. The test is being further studied by Group IV of the SPI Plastics Film, Sheeting, and Coated Fabric Division.

Oil extraction and water extraction values are dependent on time and temperature of immersion and on specimen thickness. High viscosity of the extractant also reduces extraction rates. Weight loss of specimens under specified conditions of immersion provides valid results if the extractant is not compatible with the resin. Distortions of results caused by absorption of oil by the plastic are usually minor compared with weight loss caused by removal of plasticizer by the oil.

Extraction by water presents other problems, such as solubility of the plasticizer in water, and interfacial tension of water against the plastic. Soaps and detergents greatly increase plasticizer extraction rates in this test. The problem of standard water extraction tests is also receiving active study, and commendable progress has been made.

Plasticizing efficiency is indicated by the amount of plasticizer required to produce a specific desired effect, usually an empirically standard flexibility or hardness at room temperature. Shore durometer hardness and stiffness or extensibility at 1,000 psi. are suitable methods of testing. Tensile strength and ultimate elongation are not suitable for determining plasticizer efficiency because of the vastly different curvatures of the stress-strain diagrams of different sheetings.

Flammability, while very important, has been a very difficult property to measure quantitatively.

Weathering tests are usually made by outdoor exposure of film or sheeting in Florida in order to obtain fairly prompt results without having too artificial conditions. Outdoor exposure in other localities is also frequently used, but comparative results are difficult to obtain in areas where the weather is cloudy much of the year. The Weather-Ometer with the water spray has given very good correlation with Florida exposure data, especially when the temperature is controlled, and Corex filters are not used beyond 2,000 hours. The Fade-Ometer, while quite popular for evaluating fabrics, is not reliable for predicting outdoor failure of vinyl film and sheeting.

Problems with Specific Items

Vinyl film and sheeting are used for hundreds of applications, but only a few main items can be briefly discussed here.

Shower curtains require good drape, tear strength, water resistance, dependable heat sealing, uniform printability, and absence of unpleasant odor. Weathering, resistance to extraction by oil, and low temperature properties are not so important as in some other applications.

Inflatables should have good water resistance and light stability (see Figure 1). Heat sealability must be uniformly good, and printability is often a factor. Low temperature properties, plasticizer migration, and flame resistance are usually not important.

Upholstery sheetings (see Figure 2) should contain plasticizers having low migration rates, and the sheeting should have good fatigue resistance, good low temperature properties, high tear strength, and, in many instances, flame resistance and

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[1] Presented before Plastics Film, Sheeting, and Coated Fabrics Division, Society of the Plastics Industry, Inc., New York, N. Y., May 26, 1950.

[2] Development laboratories, Bakelite Division, Union Carbide & Carbon Corp., 122 E. 42nd St., New York 17.

[3] India Rubber World, 118, 530 (1948).

[4] *Ind. Eng. Chem.*, 37, 504 (1945).

[5] *J. Polymer Sci.*, 2, 115 (1947).

[6] *Ind. Eng. Chem. (Anal. Ed.)*, 17, 730 (1945).

[7] M. C. Reed and L. Connor, *Ind. Eng. Chem.*, 40, 1414 (1948).

Fig. 1. Vinyl Inflatables, Such as This Six-Foot Wheel, Must Be Compounded to Withstand Severe Punishment in Service

excellent light stability.

In baby pants the chief requirements are soap water resistance, good tear strength, freedom from irritant properties when in contact with skin, and resistance to discoloration by sulfur compounds. Low temperature flexibility, flame resistance, and light stability are of secondary interest.

Automobile rear windows require clarity above all, and also good color, light stability, good low temperature properties, and blush resistance.

In food packaging films the requisites are resistance to extraction by oil and water, freedom from odor or taste, dependable heat sealing behavior, and absence of toxicity in any extractable material.

The above are illustrative of the varied requirements for films and sheetings used in diverse applications. No one plasticizer combines all of these properties to a degree sufficient to satisfy all uses. It is also often impossible for a manufacturer to know into what items his film may go.

Chemical Types of Plasticizers

Plasticizers are essentially high boiling or non-volatile solvents for the resin. They have two primary functions: converting a rigid resin to a pliable product; and lowering the processing temperature of the compound.

Of the several chemical classes of compounds employed for plasticizing vinyl resins, esters account for by far the largest volume. In this group are included dioctyl phthalate, dibutoxyethyl phthalate, tricresyl phosphate, ethylhexyl diphenyl phosphate, polyglycol fatty acid esters, alkyl ricinoleates, tetrahydrofurfuryl oleate, alkyl sebacates, alkyl azelates, alkyl adipates, polyesters of dibasic aliphatic acids and diols, and several other materials of less commercial importance.

For production of vinyl compounds having the least increase in stiffness upon cooling, aliphatic esters of aliphatic acids are preferred. Examples of this class include 2-ethylhexyl azelate, 2-ethylhexyl adipate, 2-ethylhexyl sebacate, isoctyl adipate, tetrahydrofurfuryl oleate, and polyethylene glycol esters of cocoanut fatty acids or 2-ethylhexanoic acid.

Jones[8] has pointed out that plasticizers which show the least increase in viscosity upon cooling yield vinyl compounds superior in flexibility at low temperatures. A convenient way to show viscosity-temperature relations is to plot viscosity against temperature on the chart given in ASTM Method D341-43. In general, those plasticizers having the smallest slope yield the best low temperature properties.

Aiken and coworkers[9] have also shown that there is a fair correlation between plasticizer extraction by oil and low temperature flexibility. Unfortunately, those plasticizers which perform best at low temperatures are usually readily extractible, and for this reason are the worst in marring surface coatings such as nitrocellulose. It must be emphasized here that while there are certain rules by which plasticizer performance may be predicted from chemical composition, these rules are very imperfectly understood and are to be used as guides to experiments rather than as substitutes for laboratory tests.

Esters made wholly or largely of aromatic groups, such as tricresyl phosphate and butyl benzyl phthalate, are usually more resistant to extraction than aliphatic esters, hence less disposed than strictly aliphatic compounds to mar surface coatings. On the other hand, the aromatic esters generally produce compounds having poor low temperature properties.

Aromatic-aliphatic esters, such as dioctyl phthalates and alkyl aryl phosphates, usually have intermediate properties with respect to extractions by oils, marring, and low temperature behavior. Saturated heterocyclic compounds, such as cyclohexanol and tetrahydrofurfurol, provide esters with properties intermediate between those derived from aromatic and linear aliphatic raw materials.

Dibasic acids may be esterified with bifunctional alcohols to produce linear polyesters. Because of their high molecular weights, these polyesters are substantially non-volatile and in some cases are very resistant to extraction by water and mineral oil. Because of this latter property some of the polyesters have performed admirably in applications where resistance to oil and grease is important.

The field between the monomeric esters and the high polymeric esters is also well populated. A number of polyesters having very low volatility, but fairly high rates of extraction from film have been made. These serve a very useful function when properly applied, but do not match the performance of those compounds which are devoid of low polymeric fractions.

Hydrocarbon-type plasticizers are limited to aromatic compounds with methyl or other short aliphatic substitutions because the strictly aliphatic hydrocarbons are not sufficiently compatible with vinyl chloride resins. These plasticizers are fairly oil resistant, but are quite ineffective at low temperatures and often have poor light resistance. These materials are used chiefly as extenders for ester-type plasticizers.

Chlorinated hydrocarbons are currently being tested in film and sheeting applications. From 40-50% of chlorine appears to be the most favorable range, and results obtained with some samples of chlorinated paraffins indicate that they have good heat stability and light resistance when properly stabilized, low migration rates, low volatility, limited compatibility, and poor plasticizing efficiency. This latter property is not altogether unfavorable in view of the low cost of these extenders. Flame retardant action is another desirable property. Chlorinated hydrocarbons cannot be used to replace more than one-quarter to one-third of the primary plasticizer without danger of spewing.

Nitrile rubber has been used quite successfully in cast film, especially in the color-it-yourself oleomargine package. Oil and fat resistance is the chief virtue of nitrile rubber as a plasticizer. Being a high polymer, it does not diffuse or migrate, hence does not mar surface coatings and is acceptable for use in contact with certain foods. Film plasticized with nitrile rubber stiffens on cooling a little more than normally, but has a fairly low brittle temperature. The main disadvantages of nitrile rubber as a plasticizer are a tendency to produce rough calendered products, and a stiffening and loss of tear strength upon weathering. These deficiencies can be overcome to a large extent by the use of fillers and opacifiers and by careful processing.

The grades of nitrile rubber highest in acrylonitrile content are the most compatible with vinyl chloride resins. High acrylonitrile to butadiene ratio is disadvantageous, however, with respect to flexibility or softness at low temperatures. An acrylonitrile content of 25-35% in the polymer is the preferred amount for use as a vinyl plasticizer.

Fig. 2. In This Office Vinyl Has Been Used Not Only for Chair Upholstery and Window Curtains and Drapes, but Also for Wall and Ceiling Covering

[8] *Trans. Inst. Rubber Ind.*, 21, 298 (1946).
[9] W. Aiken, T. Alfrey, A. Jannsen, and H. Mark, *J. Polymer Sci.*, 2 (1946-1947).

SPE National Technical Conference Set for New York Next Month

FINAL plans have been announced for the seventh annual National Technical Conference of the Society of Plastics Engineers, Inc., to be held on January 18-20 at the Hotel Statler, New York, N. Y. An attendance of more than 1,000 technologists from the plastics and related industries, drawn from all parts of the United States, Canada, Mexico, and many foreign countries, is expected at the three-day meeting, which will feature an integrated program of technical papers built around the Conference theme, "Plastics Shape the Future."

In addition to morning and afternoon technical sessions on January 18 and 19 and a morning session on January 20, the Conference will include both luncheon and banquet meetings. The luncheon, on January 18, is part of the Society's annual business meeting at which reports will be heard from the various committees; the new national officers for the coming year will be announced, and prizes will be awarded to the winners in the Society's 1950 Prize Paper Contest.

The annual banquet, on January 19, will be a gala affair and will include an entertainment program followed by an evening of dancing. A separate program for ladies has been set up, including tours of the United Nations establishment and of other points of interest, a breakfast and fashion show at a leading department store, and other activities. Favors and prizes will also be distributed at the luncheon.

The Conference is being sponsored jointly by the New York and Newark sections of the Society, who have set up a committee to handle all arrangements. Registration fees are as follows: SPE members, $5; non-members, $7.50; and ladies, $2. Luncheon tickets (for SPE members only) are priced at $3.50; while banquet tickets are $7.50 a person. Advance registration and ticket blanks may be obtained from the SPE National Office, 409 Security Bank Bldg., Athens, O.

Program and Abstracts of Papers

Thursday Morning—January 18
Georgian Room, Hotel Statler
Stanley Bindman, Presiding

9:45 a.m. **"Underwriters' Laboratories Viewpoint on the Use of Plastics."** Karl S. Geiges, Underwriters' Laboratories, Inc., New York.

The application of plastics in equipment listed by U.L. is of concern both from the standpoint of mechanical and electrical properties for doing the job at hand and also from the standpoint of flammability which, in general, should be kept to a low level for minimum fire hazard. Also, a new problem was largely introduced by the development of thermoplastics: namely, the effect of softening under moderate amounts of heating. These two features cover the primary interest of U.L. engineers in plastic applications. The relation of materials that have balancing characteristics have received considerable attention which, in turn, has been responsible for recognition of the new plastics as having special and highly desirable characteristics.

10:30 a.m. **"Properties, Applications, and Processing of Rigid Vinyls."** C. E. Parks, B. F. Goodrich Chemical Co., Cleveland, O.

High molecular weight polyvinyl chloride has excellent properties for rigid thermoplastic applications, but is generally considered too difficult to process. This paper reviews the early attempts to correct the processing difficulties by adding small amounts of plasticizer and presents data to show that this practice causes a significant loss in physical properties. Also included in this survey is a discussion of low molecular weight copolymer resins which can be processed without plasticizer.

A new high molecular weight polyvinyl chloride resin is described which has much wider application possibilities because of its added toughness and higher temperature softening point. This resin can be processed satisfactorily on conventional equipment without the aid of plasticizers. Several applications are suggested which require the good physical and chemical properties of a high molecular weight unplasticized polyvinyl chloride plastic.

11:15 a.m. **"Plastics Industry in Great Britain."** H. V. Potter, Bakelite, Ltd., London, England.

Thursday Noon—January 18
Grand Ballroom, Hotel Statler
C. Todd Clark, Presiding

12:00 p.m. **SPE Annual Luncheon and Business Meeting.** Luncheon talk: **"Materials Supply Prospects in 1951."** Frank H. Carman, Manufacturing Chemists' Association, Inc., Washington, D. C.

This paper will stress the importance of basic chemicals and the supplies of these chemicals to the plastics industry. It will be emphasized that these chemicals are becoming an ever more important and controlling factor in our materials supply. Although production of plastics is running at extremely high levels and capacity has been expanded greatly since World War II, the industry is still short for many important uses. Probable effects of mobilization, as it may be accelerated in the early part of 1951, will be forecast insofar as possible.

Luncheon talk to be followed by annual business meeting.

Thursday Afternoon—January 18
Georgian Room
Russell B. Akin, Presiding

3:45 p.m. **"A Family of High-Speed Thermoset Plastic Molding Materials."** Michael J. Brown, Jr., Libbey-Owens-Ford Glass Co., Toledo, O.

The decade of thermoset plastics, 1930-39, marked the introduction and development of ureas, melamines, cast phenolics, and the rounding out of phenolic molding materials. 1940-1949 was the decade of the thermoplastics, with extremely rapid growth in the plastics industry marked largely by phenomenal expansion in styrene, acrylic, vinyls, and other thermoplastics.

New growth in thermosets depends on the development and the acceptance of new materials, new equipment, and a basically new approach to the techniques of fabricating thermoset materials. The problems faced today by the thermoset plastics which must be solved in order to assure continued growth are: (1) develop materials and methods that will enable compression molding to compete economically with injection and extrusion molding; (2) develop methods of fabricating economically very large parts with high strengths without exorbitant increases in the size and massiveness of molding or fabricating equipment; and (3) develop materials which will present physical properties to enable plastics to serve where no plastics are now acceptable.

A start has been made toward the solution of these problems. Molding materials with fabricating characteristics quite different from those applied to standard thermoset materials are now available and are in commercial use. Work is progressing on adding to the family of materials based on polyester resins which have molding characteristics permitting an attack on the basic problems outlined above.

4:30 p.m. **"Molding and Extrusion of Teflon."** David D. James, E. I. du Pont de Nemours & Co., Inc., Arlington, N. J.

Teflon is one of the most unusual plastics developed in recent years. Its outstanding chemical and physical properties have created wide interest in this new engineering material. Industrial uses of Teflon are based on its temperature resistance, chemical inertness, electrical properties, and non-adhesive characteristics.

The fabrication of Teflon is related to powdered metal techniques. In molding, the polymer is preformed, baked, and then cooled under pressure. When maintenance of close dimensional tolerances on a molded part is necessary, the baked piece is coined while still hot.

Teflon can be extruded by means of a screw or ram extruder into rods and tubes of various sizes. In extrusion, unlike other plastics, the screw or ram compacts under no heat into long-land dies where sintering is accomplished.

The method used for coating electrical conductors depends on the required wall thickness of the Teflon. Thick walls are produced by screw extrusion of granular polymer. Intermediate wall thicknesses are made by ram extrusion of a lubricated dispersion of the polymer. Very thin walls can be coated on wire by dipping the wire into a Teflon suspensoid.

Friday Morning—January 19
Georgian Room
James C. Growley, Presiding

9:30 a.m. Panel discussion on **"Injection Molding Machines of the Future."** Moderator—Islyn Thomas, Thomas Mfg. Co., Newark, N. J. Panel members—J. F. Hronek, Fellows Gear Shaper Co., Springfield, Vt.; David J. Sloane, Lester Engineering Co., Cleveland, O.; Albert Spaak, De Mattia Machine & Tool Co., Clifton, N. J.; George W. Whitehead, Improved Paper Machinery Corp., Nashua, N. H.; and James S. Wilson, Watson-Stillman Co., Roselle, N. J.

Mr. Thomas will begin the discussion with a brief review of the history of injection molding machines since 1872. He will then submit prepared questions to the panel members for their answers and discussion. These questions are designed to elicit information on the probable future course of development of injection machines, including (1) future designs of heating cylinders; (2) standardization of machine components, such as radii on nozzles, platen sizes, etc.; (3) the relative values of toggle and hydraulic clamps; (4) preplasticizing; and (5) eventual size of machines.

11:00 a.m. **"After-Treatment of Molded Polystyrene Parts."** Charles J. Snyder, Koppers Co., Inc., Pittsburgh, Pa.

In order to cover all phases of the "After-Treatment of Molded Polystyrene Parts" it would be necessary to discuss annealing, destaticizing, painting, coating, machining, and fabricating operations. However, in order to narrow the scope of the subject, the phase concerning all the ramifications of annealing has been chosen.

This choice has been made because high labor costs, material shortages, and keen competition in the plastics industry make the annealing method of saving parts very attractive.

Annealing, according to the dictionary, means to free from internal stress by heating and gradually cooling. Annealing of molded polystyrene parts similarly means to relieve, either partially or totally, the major stresses and strains set up in the part during injection molding, machining, fabricating, or by external loading. This is accomplished in polystyrene by controlled heating and cooling of the part. Various mechanical means of accomplishing this relief of strains are possible and are determined by the economies to be effected. A detailed consideration of the advantages and shortcomings is necessary to round out the picture. In addition, it is important to have a simplified control testing procedure available to demonstrate the effectiveness of the operation.

A review of the entire picture, including the advantages in the form of savings and the possible limitations, will provide justification for annealing molded polystyrene parts.

FRIDAY AFTERNOON—JANUARY 19
Georgian Room
Arthur S. Jacobs, Presiding

1:45 p.m. **"Conditioning Phenolic Materials for Stability in Molding."** Jerome L. Formo, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

The effect of varied conditions in the steam preheating process has been studied with regard to volatiles produced during the preheating and molding operations, the mechanical and electrical properties of as-molded test pieces, and the long-time aging characteristics of molded phenolics.

Relations are shown between moisture conditions in the preheating chamber and quantities of volatiles produced under a variety of conditions. Similarly, relations are shown to exist between moisture conditions and various physical properties, including tensile strength, flexural strength, impact strength, shrinkage, and electrical properties.

The effect of long-time aging under various conditions indicates that exposure conditions after molding are of much greater consequence than conditions existing during the molding operation.

2:30 p.m. **"Polyesters."** Earle S. Ebers, United States Rubber Co., Naugatuck, Conn.

Polyesters are an outgrowth of the alkyd resins so widely used in finishes and protective coatings. The value of the alkyd is illustrated by the growth and consumption from 138,000 pounds in 1917 to about 138,000,000 pounds in 1944. The family of resins now known as polyesters was born in 1937. These resins consist of an unsaturated alkyd in combination with an unsaturated monomer. Although barely past the experimental stage, polyesters were put into full-scale use during World War II and made many notable contributions. This paper will review the wartime contributions of the polyesters, their outstanding properties and methods of utilization in current products and will also attempt to forecast future developments.

3:15 p. m. Symposium on **"Distribution and Production Picture on Large Injection and Compression Moldings."** Edmond D. Kennedy, Edwin L. Hobson, Frank J. Donohue, and Sanford E. Glick, all of Monsanto Chemical Co., Springfield, Mass.

Mr. Kennedy will direct the course of the discussion and introduce the other speakers.

Mr. Hobson will discuss present marketing of large moldings, such as in refrigeration, television, radio, luggage, and display signs. He will also discuss future developments in other fields, including furniture, air conditioning units, plumbing, architecture, etc.

Mr. Donohue will speak on design factors with large thermosetting moldings, as well as material properties.

Mr. Glick will note that although styrene was first used in the novelty field because of its low cost, it has gained increasing importance in industrial applications. Properties of styrene which stimulate this industrial trend include excellent dimensional stability, low moisture absorption, low specific gravity, uniform physical properties, non-retention of odor, resistance to attack by a wide range of chemicals and foodstuffs, and ease of molding.

Since plastics are organic compounds, they inherently have a certain amount of instability of one type or another. These types of instability include: (1) zero stress dimensional stability (the effect of humidity, drying, and cycling when no load is applied); (2) heat distortion temperatures; (3) cold flow; (4) effect of temperature on physical properties; (5) water absorption; (6) volatilization of compound and plasticizers; and (7) presence of internal strain.

Additional information is presented on zero stress dimensional stability, heat distortion temperatures, flammability, and cold flow, as well as the effect of temperature on physical properties. Of particular importance for industrial applications are some of the more recent developments in materials. The heat resistant styrenes, high impact styrenes, and flame resistant styrenes are discussed. Photographs and diagrams illustrating the various applications are presented.

FRIDAY EVENING—JANUARY 19
Grand Ballroom
1951 SPE National President, Presiding

7:15 p.m. **Annual Banquet.** After-dinner speech: **"Synergism."** John P. Coe, United States Rubber Co., New York.

SATURDAY MORNING—JANUARY 20
Georgian Room
Samuel Silberkraus, Presiding

9:30 a.m. **"Plastisol Molding."** C. W. Patton, Union Carbide & Carbon Corp., New York.

10:15 a.m. **"Designing Better Plastics Products."** Carl W. Sundberg, Sundberg-Ferar, Detroit, Mich.

The plastics industry has become design conscious. No other materials adapt themselves so well to the attractive modern shapes which plastics make possible. At the same time, plastics are ideal production materials since even the most intricate and complicated forms may be readily reproduced in unlimited number quickly and at low cost.

There are many different plastics and plastics processing techniques. The designer must be familiar with them all and be able to select the proper material and process for each individual job. The physical characteristics of the plastic materials are important, but so, too, are such considerations as material costs, adaptability to available manufacturing equipment, and, of course, appearance and style. The design of a product is to some extent limited by the plastic mold and by the finishing equipment at hand. All such factors must be evaluated before a final design can be successfully evolved.

11:00 a.m. **"Masking Problems in Manual and Automatic Spray Painting of Molded Plastic Parts."** Hamilton E. MacArthur, Conforming Matrix Corp., Toledo.

The paper will begin with a review of long-established masking practices using tape, die-cut adhesives, silk screening, hot stamping, printing, rolling, and hand-worked sheet metal masks. There will also be a discussion of metal masks used in spray painting decoration, both fabricated and electro-forbed masks. Recommendations will be made concerning the proper selection of the three general types of electro-formed masks, as follows: (1) the lip type to paint depressed letters or designs; (2) the plug type to paint relief or raised areas; and (3) the block cut-out type to spray decorate areas too small for practical precision masking, thereby necessitating some wiping.

The paper will also include suggestions as to when holding and pressure fixtures are desirable; comments on design of the part and mold so as to reduce costs in the painting of the part; and remarks on machinery available and machinery prospects in development for automatic spray painting of plastic parts with the use of metal masks.

11:45 a.m. **Presentation of Winning Papers in the SPE 1950 Prize Paper Contest.**

Sections Hold Regular Sessions

New York-Newark Joint Meeting

The New York Section was host to the Newark Section at a joint dinner-meeting on November 15 at the Hotel Shelburne, New York, N. Y. Approximately 95 members and guests of the two groups heard a talk on "Application of Speed Nuts to Plastics" by H. R. Russell and William Buttriss, Tinnerman Products, Inc.

Mr. Russell began by showing a sound film on speed nuts and their use in reducing fabricating and assembly costs. Mr. Buttriss then outlined the principles of spring-tension fasteners, their history, the different types available, and their advantages, using many slides of typical applications to illustrate his talk.

Mr. Buttriss noted that the principal problems in the fastening of plastics are: (1) fasteners must harness the cold flow of thermoplastics; (2) resilient fasteners with a greater load area are needed for thermosets; and (3) fasteners must provide cheaper and faster assembly than obtained with metal inserts. Speed nuts meet these requirements and are also claimed to give assembly cost savings of 30-75% over other fastening methods. The speaker emphasized that while many types of speed nuts, clips, pins, rings, clamps, and retainers have become standardized, the company maintains a development department prepared to analyze fastening problems and provide fasteners to meet any individual requirement.

Mrs. Bess R. Day, SPE executive secretary who attended the meeting as the guest of the two Sections, spoke briefly on the activities of the national office in coordinating the work of the Society. Brief welcoming addresses were given by New York president Sam Silberkraus, Riverdale Laboratory, and Newark President Russell B. Akin, E. I. du Pont de Nemours & Co., Inc. Plans for the annual Christmas party and future meetings were described by Program Chairman

W. A. Ward, American Cyanamid Co. through the courtesy of Frank Kennedy, Electronic Wave Products Co., and the meeting closed with a drawing for door prizes contributed by G. Palmer Humphrey, G. P. Humphrey Plastics, and M. Miller, Miller Plastics Co.

Rich and Kennedy at Chicago

The November 8 regular joint dinner-meeting of the Chicago Section, SPE, and Midwest Chapter, SPI, was held at the Builder's Club, Chicago, Ill. Approximately 150 members and guests of the two groups heard E. B. Rich, American Wheelabrator & Equipment Co., speak on "Automatic Finishing Equipment for Deflashing Molded Phenolic Parts," and E. D. Kennedy, Monsanto Chemical Co., discuss "How Labeling Helps Sell Plastics Products."

Mr. Rich described the use of the Wheelabrator for mechanically deflashing molded phenolics. The machine is a device for throwing abrasive by centrifugal force and, because no compressed air is involved, requires less horsepower than other abrasive systems. The device is applied to different types of conveying equipment to suit the job. In the plastics field the most popular machine is a Tumblast, an endless apron-type machine which slowly turns the pieces over under the Wheelabrator blast. The Wheelabrator can be applied to a table-type unit for blasting parts that cannot be turned mechanically.

The problem in deflashing of plastics was to find an abrasive that would remove flash without harming the plastic surface, Mr. Rich said. Minneapolis-Honeywell Regulator Co. found a solution in the use of crushed apricot pits which greatly reduced finishing time when used in the Wheelabrator system. While the process has limitations when used on very heavy flash, this difficulty can be reduced by better mold maintenance.

Mr. Kennedy discussed the work of the SPI Informative Labeling Committee and discussed the advantages of proper labeling to tell purchasers how plastics differ from other materials, how they should be used, what precautions should be taken during use and storage, and the limitations of the plastic part.

Mrs. Bess R. Day, SPE executive secretary, was present at the meeting and spoke briefly on SPE activities.

Informative Labeling Discussed

A talk on "Informative Labeling" by E. D. Kennedy, Monsanto Chemical Co., highlighted the October 30 dinner-meeting of the Cleveland-Akron Section. Held at the Garden Grille in Akron, the affair was attended by approximately 40 members and guests.

Mr. Kennedy symbolized the plastics industry as a modern 1950 automobile being driven by a caveman; the automobile represented the advanced technology of the plastics industry, and the caveman represented the industry's public relations. With the "car" in relatively perfect operating condition, it is time to give some attention to improving the "driver," Mr. Kennedy said. Copies of the new SPI "Handbook on Informative Labeling" were distributed by the speaker and discussed in detail.

Section President Ward Van Orman, Goodyear Tire & Rubber Co., presided over the meeting, and the speaker was introduced by Program Chairman George Field, B. F. Goodrich Chemical Co. It was announced that the Section's annual Christmas party will be held on December 11 at the Aurora Inn, Aurora, O.

Chrome Plating Discussed

The November 1 meeting of the Western New England Section, held at the Sheraton Hotel, Springfield, Mass., featured a talk on "Chrome Plating" by Arthur Logozzo, who is with Nutmeg Chrome Corp.

Mr. Logozzo prefaced the showing of films on chrome plating with a few remarks on the necessity of good surface preparation of the metal prior to plating. Strains in steel caused by improper annealing and machining operations will show up in the plating. Another important factor is the need of sufficient polishing of the surface after hardening the steel, since the plating surface finish will reflect the surface of the underlying metal, and many defects will be magnified. The thickness of the chrome plating on molds will be generally determined by the materials to be molded, design of the molds, and other factors.

The speaker then showed two color films taken in chrome plating installations. The first film dealt with decorative chrome installations where the plating is very thin and usually done in production quantities by mechanized systems. The second film showed chrome plating of molds which is much more of an art, since elaborate positioning of anodes is needed to insure deposits of proper thickness at the proper places in the mold. The talk and the films were followed by a lively discussion period in which many questions from the members were answered by the speaker.

Premiums, Plastics, and Adhesives

Some 75 members and guests of the Newark Section attended a regular dinner-meeting on October 11 at the Military Park Hotel, Newark, N. J. In the short business session following the dinner the Section president, R. B. Akin, E. I. du Pont de Nemours & Co., Inc., reported on the recent SPI meeting with material suppliers and molders to discuss current material shortages and stated that these shortages are not expected to be alleviated within the near future because of government stockpiling.

Two talks were presented during the technical session: F. H. Waggoner, Premium Advertising Association of America, spoke on "How to Use Premiums to Increase Sales," and Ray Platow, Bell Telephone Laboratories, gave a talk on "Adhesives—Some Theoretical and Engineering Conceptions." Mr. Waggoner's talk was accompanied by a sound film and was very well received.

Mr. Platow discussed and illustrated some of the better methods of assembling metals and plastics by the use of various types of adhesives. Of special interest was an adhesive supplied in the form of a thin, dry film, similar to cellophane in appearance, and used for bonding materials by the application of heat and normal clamping pressures.

The meeting closed with a drawing for two door prizes contributed by Ed Sytes, Monsanto Chemical Co.

Cost Accounting for Plastics

A talk on "Cost Accounting for the Plastics Industry," by John K. Vlahos, Trout & Barstow, featured the October 5 dinner-meeting of the Miami Valley Section at the Wishing Well, Centerville, O. Approximately 40 members and guests heard Mr. Vlahos discuss the use of cost accounting for determining inventory valuation, the relation of costs to selling price, the elimination of unprofitable lines, improvement of efficiency, and the study of competitors' costs. In the business session preceding the talk, reports were heard from the secretary and the treasurer.

Brous on Plastics Problems

TWO problems of major significance face the plastics industry during the coming months, according to S. L. Brous, marketing manager of the chemical department, General Electric Co., Pittsfield, Mass. These problems are: (1) shortages of materials and manpower; and (2) misapplications and poor workmanship. Of these two problems, Brous believes the second to be far more important to any long-range growth and prosperity of the plastics industry.

On the onset of the current rush for goods, Brous explained, the industry had largely overcome the adverse consumer reaction to plastics materials for functional services. Present conditions are similar to those prevailing during the mid-1940's, and a wise course of action at this time will help keep history from repeating itself. Although neither the materials manufacturers nor the processors can perhaps fully control the supply and disposition of plastics, both groups can exert influence over the end-uses to which available materials may be directed. The industry must resist impulses and pressures which will result in lowered product quality, Brous declared, adding that good management and clear, far-sighted thinking can do much to further consumer confidence.

"Two Gage" Vinyl Film

THE availability of 0.002-inch thick calendered unsupported vinyl film has been announced by Ross & Roberts Sales Co., Inc., New York, N. Y. This is said to be the first time that such a film has been offered on a commercial scale. In the experimental stage for several months, manufacture of the film was finally made possible by new developments in calendering techniques and equipment. The new development makes it possible to enjoy the economy of a thin film while still retaining the advantages of a calendered product. The film is being made in a variety of colors at the company's Stratford and West Haven, Conn., plants.

Approve Coatings Standard

THE proposed Simplified Practice Recommendation for Vinyl and Pyroxylin Coated Cotton Fabrics, described in our October issue, page 63, has now been approved. According to the Commodity Standards Division, Office of Industry & Commerce, United States Department of Agriculture, the new standard, identified as R242-51, will become effective on January 1. Until printed copies of the standard are issued, mimeographed copies may be obtained from the Division, Washington 25, D. C.

SPI Holds Annual Meeting at Swampscott

THE Society of the Plastics Industry, Inc., held its annual meeting October 18-20 at New Ocean House, Swampscott, Mass. Held in cooperation with the Harvard University Business School, the meeting was restricted to members only. The three-day meeting was attended by 450 men; while between 50-75 wives participated in the separate ladies' program.

The first day, October 18, was devoted to an informal afternoon golf tournament, followed by a reception and dinner. Regular morning, luncheon, and afternoon sessions were held on October 19 and 20, with the morning sessions devoted to a program by Harvard professors; while the afternoon sessions covered topics peculiar to the plastics industry.

Program for October 19

Sherwood L. Young, C. F. Church Mfg. Co., presided over the morning session, at which three papers were given by Harvard professors, as follows: "Organized Labor's Quest for Security," James J. Healey; "Production Lesson from World War II," Frank F. Gilmore; and "Executive Development—The Concept of Coaching," Myles L. Mace.

A talk on "Properties of Rigid Plastics—Use and Misuse," by Robert Burns, Bell Telephone Laboratories, Inc., featured the luncheon-meeting presided over by H. A. Jones, New England Tape Co., Inc. Mr. Burns discussed the principal types of rigid plastics in terms of their usefulness in parts where mechanical and electrical properties are essential to satisfactory performance. The speaker emphasized only those properties of each type that are unique and exert a strong influence on the part's behavior in service. Properties discussed included cold flow, stress release, maximum service temperature, crazing and cracking, and unusual electrical properties.

The afternoon session, presided over by N. A. Backscheider, Recto Molded Products, Inc., was devoted to compression molding, with the following papers presented: "New Frontiers for Impact Materials," Saul M. Silverstein, Rogers Corp.; "The Future for Moldings over 20 Pounds," Dan H. L. Jensen, Philco Corp.; and "Compression Molding of Reinforced Plastics," Clare E. Bacon, Owens-Corning Fiberglas Corp.

Mr. Silverstein said that lack of imagination is the reason why impact resistant plastics have not crossed the frontiers of structural application. If mechanical engineers will take a plastics board, for example, look upon it as an alloy, and develop the tools and dies to form it by the square yard instead of the square centimeter, then that material's advantages of weight, noiselessness, low conductivity, ready made finish, etc., would overcome the difference in price. In addition, Mr. Silverstein said, if the chemists will produce that material by the ton instead of by the pound, the price differential would quickly narrow anyway.

Mr. Jensen suggested several applications for large moldings, but warned that the future of moldings over 20 pounds in weight will not be easy to achieve. The greatest possibilities will not be attained in the very beginning, but by learning from experience it should be possible to attain an expanding future for large moldings.

Mr. Bacon gave a detailed discussion of the properties of glass reinforced plastics, particularly in comparison to those of polyester plastics and certain metals. Various applications of glass reinforced plastics were described, together with the reasons for their use in these applications, and the speaker suggested that further applications will depend on the resourcefulness of molders.

G. V. Sammet, Jr., Northern Industrial Chemical Co., acted as toastmaster at the banquet concluding the day's program. After-dinner speakers were John Fisher, Canadian lecturer, who spoke on "Tomorrow What?", and Elmer French, Firestone Plastics Co., who gave a progress report on the SPI informative labeling program.

Events on October 20

The morning session, with C. J. Romieux, American Cyanamid Co., presiding, featured three talks by Harvard professors. John G. McLean spoke on "Managerial Problems in Plastics"; Edward C. Bursk discussed "Creative Effort in Industrial Marketing," and Neil H. Borden talked on "Satisfying the Consumer."

Society President Horace Gooch, Jr., Worcester Molded Plastics Co., presided over the luncheon session, which featured a talk on "Russia" by Major General H. J. Knerr.

An injection molders' meeting was held in the afternoon, with A. N. Williams, General American Transportation Corp., in the chair. The three papers presented at this session were: "Improvement of Thermoplastic Products by Post-Molding Treatments," Stanley R. Melvin, Monsanto Chemical Co.; "A Study of the Mold Pressure Cycle," G. D. Gilmore, Dow Chemical Co.; and "Preplasticizing Equipment for Injection Molding Presses," W. G. Whitehouse, Crown Machine & Tool Co.

Mr. Melvin discussed the different methods of treating molded products to improve their appearance and properties and to expand their suitability for use in different applications. Treatments discussed were decoration, including lacquering, silk screening, hot stamping, printing, use of decalcomanias, and others; destaticizing; annealing; metallizing, including electroplating, spray plating, vacuum coating, and sputtering; and machining and finishing.

Mr. Whitehouse described the Crown preplasticizer for use on injection molding machines, its method of operation, and the advantages to be derived from preplasticizing. These advantages include lower pressures, more uniform heat, faster injection speeds, greater projected areas, more uniformity in molded parts, better mold release, cheaper mold costs, and parts with less strain and stress. On the other hand it is not possible to obtain good mottling in an injection molding when preplasticizing is used.

The three-day meeting concluded with an informal dinner at which no talks were presented. An innovation at the meeting was the use of special seating arrangements at the luncheon sessions. Tables were set up to handle subjects such as accounting, film and sheeting standards, exposition, public relations, etc., and members were invited to seat themselves at the table devoted to the subject of their major interest. Informed SPI members were present at each table to lead the discussion of the subject.

Film, Sheeting and Coated Fabrics Conference, December 14-15

The second conference of the SPI Plastics Film, Sheeting, and Coated Fabrics Division is scheduled for December 14 and 15 at the Commodore Hotel, New York, N. Y. Open to all interested persons, the Conference will cover subjects of interest to both the management and technical staffs of this portion of the plastics industry. According to William T. Cruse, SPI executive vice president, an attendance of 400 persons is anticipated.

Papers to be presented at the meeting will cover such subjects as colorant, surface coatings and free film from organosols and plastisols, accurate temperature control and variation of temperature for calenders and presses, a review of vinyl embossing, the raw material supply situation, and merchandising of finished products.

Paper-Plastics Conference

SOME 272 representatives of the paper and plastics industries, government, and research institutions attended the TAPPI Paper-Plastics Conference on October 19-20 at the College of Forestry, State University of New York, Syracuse. Sponsored by the plastics committee of the Technical Association of the Pulp & Paper Industry, the Conference included luncheon meetings and morning and afternoon technical sessions.

The October 19 morning session, on "Properties of Plastics in Relation to Papermaking," featured four papers: "New Polymers and Their Possible Application to Paper," Herman Mark, Polytechnic Institute of Brooklyn; "Adhesion Fundamentals," D. B. Hatcher, Plaskon Division, Libbey-Owens-Ford Glass Co.; "Permeability of Polymers to Vapors," A. D. McLaren, Polytechnic Institute of Brooklyn; and "Effect of Plasticizers on Physical Properties of High Polymers," R. S. Boyer, Dow Chemical Co. Dr. Boyer discussed solvent-type plasticizers in terms of their compatibility, efficiency, and permanence and showed how these three factors are interrelated.

The luncheon meeting, held at Drumlins Country Club and attended by 165 persons, featured a short talk by Dean J. S. Illick on work at the College of Forestry on wood chemistry and plastics.

The afternoon session, on "Beater Addition Fundamentals," comprised the following four papers "Effect of Latex Variables in Beater Addition of Nitrile Latices," and "Effect of Certain Papermaking Variables in Beater Addition of Nitrile Latices," both by D. M. Yost, Sorg Paper Co., and W. H. Aiken, Goodyear Tire & Rubber Co.; "Phenolic Resins in Paper Modified by Acrylonitrile Rubbers," R. C. Bascom, B. F. Goodrich Chemical Co.; and "Applied Studies of Cationic Urea Formaldehyde Wet Strength Resins," I. J. Gruntfest, E. M. Young, Jr., and V. J. Moser, Rohm & Haas Co.

The first paper by Yost and Aiken noted that work on nitrile latex variables has been limited to latices prepared by one basic polymerization system and tested in a medium beaten Scandinavian unbleached kraft pulp. Optimum properties were obtained with a latex of medium acrylonitrile content and molecular weight, with no additional stabilization after polymerization. The second paper reported on results of tests to determine time of addition of the latex to the pulp, time of latex coagulation, and effect of latex quantity and pulp consistency on final properties. Mr. Bascom described work being done on the use of phenolic resin-

(Continued on page 343)

Scientific and Technical Activities

ISO Technical Committee 45 Akron Meeting

THE first meeting in the United States of the International Organization for Standardization's Technical Committee 45 on Rubber was held at the Mayflower Hotel in Akron, O., from Monday, October 16, through Friday, October 20. This Committee is one of the many in the list of organizations under the heading of the ISO.

In 1946 the 20 member countries of the International Federation of International Standardization Associations met in London together with representatives of the standardization bodies of other countries in order to discuss and approve "the constitution of a new international organization whose purpose was to facilitate the international coordination and unification of industrial standards." Thus the ISO with 64 delegates from 29 countries was established. In 1947 the United Nations, realizing that standardization was a necessary part of its activities, made an arrangement with the ISO to carry out such standardization procedures as were deemed essential. At present 75 committees are working toward standardization of everything from screw threads to rubber.

At the meeting in Akron of the rubber committee 35 delegates were present, representing seven different countries. W. J. S. Naunton, of Imperial Chemical Industries, Ltd., was chairman of the meeting. Since England holds the Secretariat, H. M. Glass, of the British Standards Institute, was secretary. Both of these gentlemen may be seen in the accompanying photograph, Figure 1. Henry St. Leger, General Secretary of the ISO, was also present, and he is shown (Figure 2) addressing those present at the banquet held on the evening of October 17 at the Mayflower Hotel. The gentleman on his left is Simon Collier, Johns-Manville Corp., chairman of ASTM Committee D-11 on Rubber. Also present were H. M. Lawrence, representing the American Standards Association, and C. L. Warwick, representing the American Society for Testing Materials. The complete list of members by countries follows:

France: J. Duval, leader of the delegation, directeur technique de l'AFNOR; Mr. Bocquet, administrateur directeur general de l'I.F.C. et de l'I.R.C.I.; J. LeBras, inspecteur general scientifique de l'I.F.C. et de l'I.R.C.I.

Italy: Stefano Oberto, S. A. Pirelli.

Netherlands: A. Van Rossem, leader of the delegation, director, Rubber Instituut, T.N.O.; B. B. S. T. Boonstra, research department, Rubber-Stichting; E. C. J. DeDecker, director, research department, Rubber-Stichting; R. Houwink, general director, Rubber-Stichting.

New Zealand: V. Armstrong, New Zealand Scientific Liaison Office (observer).

Switzerland: R. Herzog, Maison Datwyler, A. G., Altdorf.

United Kingdom: J. R. Scott, leader of the delegation, Research Association of British Rubber Manufacturers; C. M. Blow, British Rubber Producers Research Association; J. M. Buist, Imperial Chemical Industries; L. Crompton, Dunlop Rubber Co., Ltd.; G. L. Hammond, Ministry of Supply; G. Martin, London Advisory Committee for Rubber Research (Ceylon & Malaya); E. A. Murphy, Dunlop; R. G. Newton, BRPRA; E. F. Powell, Dunlop.

United States of America: Mr. Collier, who was the leader of the delegation; G. H. Barners, Goodyear Tire & Rubber Co.; N. Bekkedahl, National Bureau of Standards; A. W. Carpenter, B. F. Goodrich Co; L. E. Cheyney, Minnesota Mining & Mfg. Co.; L. V. Cooper, Firestone Tire & Rubber Co.; S. R. Doner, Manhattan Rubber Division, Raybestos-Manhattan, Inc.; B. S. Garvey, Jr., Sharples Chemicals, Inc.; E. G. Kimmich, Goodyear; Mr. Lawrence; G. C. Maassen, R. T. Vanderbilt Co.; R. F. Tener, NBS; Mr. Warwick.

The agenda of the meeting was very extensive and included a discussion on the following properties: hardness, tension stress-strain, tear strength, ply adhesion, aging, abrasion, grading of crude natural rubber, latex, flex cracking, rubber to metal bonding, dynamic testing, and classification of vulcanized rubber by physical properties.

On Tuesday evening, October 17, a banquet was held at which the Law Director of Akron was the principal speaker, followed by short speeches by Mr. Collier, Dr. Naunton, and Mr. St. Leger. The leaders of the various delegations from abroad expressed their appreciation of the hospitality shown them in the United States and said that they wish to reciprocate as soon as possible.

Other photographs taken at the banquet show, left to right: (Figure 3) Mr. & Mrs. A. W. Carpenter, Mr. & Mrs. C. L. Warwick; and (Figure 4) A. E. Juve, B. F. Goodrich Co.; Mr. Buist; Mrs. A. E. Juve; and Mr. Maassen.

Brief summaries of the discussions on the various subjects are given below.

Hardness Testing

It was decided that the size of the ball at the end of the plunger of the hardness testing instrument should be 2.44 millimeters because this would permit the use of either the American or British standard, since the value falls halfway between the two standards. It was decided that the zero load should be 30 grams, and the total load should be 570 grams. With regard to the temperature of test, the French use a temperature of 20 $\pm 5°$ C., but after some discussion it was decided that the temperature of test should be 20 $\pm 2°$ C., and that if lower or higher temperatures were necessary, they could be specified when the test results were presented. It was also decided that in international reports the hardness number should be called International Hardness Degrees. The test piece should be maintained under the specific conditions for at least 12 hours prior to testing.

Tension Strain Testing

Dr. Scott, who discussed tension strain testing, pointed out that the American-type dumbbell specimen gave the most uniform results. It was emphasized that breaks outside the gage marks were not a disadvantage, and this fact was confirmed by the United States delegation. It was decided that the tension stress-strain test piece should be that described as die C, in ASTM D412-49T. The distance between the gage marks should not be more than one inch.

Tear Strength Testing

Mr. Buist introduced this subject by outlining developments at previous meetings. The effect of thickness on type of test piece and the method of checking the sharpness of the cutting dies were discussed. Because there was considerable difference of opinion on the use of the angle *versus* the crescent test pieces, it was agreed that Mr. Buist and F. L. Graves, American Cyanamid Co., of the United States, should discuss this matter outside the meeting and present their results to the committee later. These results were presented, and it was decided that the crescent test piece should be adopted at present as the recommended type. It was suggested, however, that all delegates should gain experience with both methods with a view to future consideration of the whole matter again at a later date.

Ply Adhesion Testing

Since it has been found that ply adhesion does not depend on the thickness of the sample, it was resolved that there should be no upper limit to the thickness of the test piece. Although there is not too much difference in results when the speed of stripping is changed, it was decided to allow the speed of jaw separation of the testing machine to be between two and 10 inches per minute. It was also recorded that the thickness of ply or layer being separated should not be greater than the remaining portion of the test piece and should in no case be greater than 1/4-inch.

Aging

The variables concerned with natural and accelerated artificial aging were taken up, and the conditions were set at various limits. For example, all test pieces should be stored in the dark before accelerated aging tests; the maximum temperature of storage before testing should not exceed 30° C.; the maximum time of storage should not exceed 14 days; the piece should have a good smooth finish, and a large number of other conditions were specified so that the material will be tested in the manner desired. In air oven aging tests it was stated that there should be a slow circulation of air in the oven of not more than one change of air in one hour and not less than one change in three hours.

Abrasion Testing

A number of points were presented including data on comparison of various laboratory tests with actual road testing of tires. It was generally agreed by the delegates that any laboratory abrasion test method was difficult to correlate with road tests, and at the present time the committee should not standardize on any one laboratory test until further data were available. A number of details regarding the du Pont method were given, and a decision was made on the amount of air to be used in cleaning the surface of the test piece and on various other matters associated with the standardization of this particular test.

Grading of Crude Natural Rubber

Methods of sampling natural rubber and details regarding the Mooney viscosity test were discussed. The French delegates

gave a paper on their general views regarding the technical classification of natural rubber, which included a determination of plasticity or viscosity on the crude rubber and a determination of modulus measured on the vulcanized material. By this method they believe they can get an exact evaluation of a given sample of rubber.

A number of details were given on methods of vulcanization including the type of mills, roll speeds, the size and the type of presses used for vulcanization, and the different standard compounding ingredients required. Mixing procedure, storage of compounded stock, vulcanization tire and temperature, were also considered. In the latter case it was proposed that the material be vulcanized at 140 to 150° C.

In order to obtain the most reproducible test results it was suggested that the testing of the vulcanized sample be done by the strain test at low stresses. Since this type apparatus is not universally available, however, stresses at higher strains can also be used. Variations in test results between laboratories was considered to require considerable additional work, and this investigation was therefore placed on a long-term basis.

The Testing of Latex

Methods of testing the mechanical stability of latices were discussed. It was reported that the speed of stirring of the latex sample should be 14,000 r.p.m., and that the temperature of test should be 35° C. Future work is to be concerned with mechanical stability, chemical stability, the KOH number, and sampling.

Flex Cracking

In connection with flex cracking tests it was said that photographs of the test pieces should be a part of such tests so that comparisons could be made at any time. It was decided that the delegates should obtain any and all information possible on flex cracking tests and especially about the DeMattia method. Four types of tools for puncturing the test piece before flexing are to be studied, and these include the round metal, the Gates, the Phillips, and the Goodrich types of tools or needles.

Dynamic Properties

Dr. Marvin of the National Bureau of Standards gave a paper on dynamic properties especially with regard to rubber. It was decided that the delegates should investigate the various tests available and report on this subject at the next meeting of ISO Technical Committee 45—Rubber.

Quebec Group Hears Crocker

THE Quebec Rubber & Plastics Group held a meeting October 19 at the Queen's Hotel, Montreal, P.Q., Canada. Approximately 60 members and guests heard E. C. Crocker, General Latex & Chemical Corp., speak on "The Manufacture of Latex Foam Rubber." Mr. Crocker's talk was identical with those he gave before the New York[1] and the Chicago Rubber groups. The talk was very well received and was followed by a lively and prolonged discussion. The speaker was introduced by D. E. Murphy, General Latex & Chemicals (Canada), Ltd., and thanked by Henry Chauvin, Dominion Rubber Co., Ltd.

[1]For abstract, see our June, 1950, issue, p. 315.

Ontario Group Hears Emmerson

A TALK on "Synthetic Rubber Derived from Petro-Chemicals," by H. R. Emmerson, Polymer Corp., Ltd., highlighted the November 14 dinner-meeting of the Ontario Rubber Section, C.I.C. Approximately 60 members and guests attended the meeting, which took place at McMaster University, Hamilton, Ont.

Mr. Emmerson described the chemistry involved in the processing of petro-chemicals in the manufacture of GR-S and Butyl. The production of the original monomers is complex, but the chemistry involved is better understood than that dealing with actual polymerization. The main stream of non-condensable gases originating from thermo-cracked petroleum can be divided into five groups; these groups are classified as having from one to five carbon atoms. Certain of these groups are burned, but the balance is subjected to further processing, such as distillation, azeotropic distillation, alkylation, and dehydrogenation, to give butadiene, styrene, isobutylene, and isoprene, which are the raw monomers for the production of GR-S and Butyl.

Witco Vinyl Stabilizer

WITCO LEAD STEARATE #50, a new high-lead content primary heat stabilizer and internal lubricant for vinyl resins and copolymers, has been announced by Witco Chemical Co., 295 Madison Ave., New York 17, N. Y. The new stabilizer is claimed to fulfill the total heat protective requirements of most vinyl compounds in which lead salts can be used. During processing of compounds the lubricating qualities of the new product are said to improve extrusion, mold flow, and release from hot roll and mold surfaces.

Applications for the new stabilizer include both translucent and opaque items such as phonograph records, insulated wire, garden hose, film, sheeting, and other products requiring economical stabilization and internal lubricity. The chemical structure of the new material is such as to provide extra quantities of reactive basic lead for stabilizing, thus reducing the quantity of stabilizer required. In addition, the product does not melt at mixing temperatures, but disperses in solid particle form, thereby minimizing the possibility of stabilizer spew or surface bloom caused by migration.

Steel—Man's Servant

A TALK on "Steel—Man's Servant," by W. T. Ellis, American Steel & Wire Co., highlighted the November 10 dinner-meeting of the Philadelphia Rubber Group. Some 80 members and guests attended the meeting, held at the Poor Richard Club, Philadelphia, Pa.

Mr. Ellis gave a brief introductory talk on the making and processing of steel, then showed two sound films which illustrated in detail all the processes involved in making finished steel products, starting with the mining of iron ore. Chairman T. J. Gorman, Quaker Rubber Corp., presided over the meeting and announced that the next meeting of the Group would be held on January 26 at the Poor Richard Club.

Connecticut Rubber Group Members with Farrel-Birmingham Production and Sales Personnel in the Company's Process Testing Laboratory at Derby, Conn. C. F. Schnuck May Be Identified in Center of Photograph in Light Suit, Facing Camera

Visit Farrel-Birmingham

APPROXIMATELY 125 members of the Connecticut Rubber Group on November 10 visited the Ansonia and the Derby plants of Farrel-Birmingham Co., Inc., where they toured the foundry, machine shops, and assembling departments and saw the casting and machining of rolls, gears, etc., and the assembly of mills, Banbury mixers, and numerous other pieces of equipment manufactured for the rubber and the plastics as well as other process industries. The tour was arranged to terminate with a gathering of all the visiting members at the company's process testing laboratory at the Derby, Conn., plant, as shown in the accompanying illustration.

Here production and sales engineers, headed by Carl F. Schnuck, F-B director of engineering, answered questions of the rubber group members, many of whom learned for the first time of the critical engineering and construction problems involved in the manufacture of rubber and plastics processing equipment.

Comments from the group indicated that the tour was particularly instructive since many saw, again for the first time, several types of machines and machine parts in various stages of construction in the plants and then, in the laboratory, were able to examine complete modern units in both laboratory and production sizes, some of which were put into operation.

Special interest was evidenced in the high-speed reclaiming process which converted shredded whole tire scrap rubber into quality reclaimed rubber by a patented treatment in a Banbury mixer, using exceptionally high ram pressures and rotor speeds.

Officers and directors of the Connecticut Rubber Group for 1951, elected as a result of recent balloting are: chairman, C. A. Larson, Whitney-Blake Co.; vice chairman, G. R. Sprague, Sponge Rubber Products Co.; secretary, G. A. Di Norscia, Sponge Rubber Products; and treasurer, F. J. Rooney, General Electric Co. Directors, in addition to the above officers, will be R. B. Norton, Kerite Co., and E. W. Owens, United States Rubber Co.

NSC Rubber Section Meeting

THE Rubber Section of the National Safety Council held two sessions on October 17 and 18 as part of the National Safety Congress in Chicago, Ill., October 16-20. H. L. Andrews, safety director of Firestone Tire & Rubber Co., Pottstown, Pa., and chairman of the Rubber Section, presided at both sessions.

In the first session Mr. Andrews gave a report on the activities of the Section, following which J. J. Raytkwich, director of safety, Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn., talked on outstanding facts in connection with the 1949-50 Rubber Section Safety Contest.

According to figures prepared by NSC, the rubber goods industry finished in fifth place among all industries, with a frequency rate of 5.1, against an overall industry average of 10.14. This rubber industry figure is a reduction of 39% from the base rate period of 1935-39 and was the greatest percentage frequency reduction of all industries. Foundries with a 34% reduction for the same period were in second place. The average frequency reduction for all industry was 12%.

A similar good result was also experienced in severity rates for 1949, where the rubber industry finished eleventh among all industries, with a figure of 0.51-day charged per 1000 manhours worked. The average severity rate for all industries for 1949 was 1.02.

W. M. Graff, U. S. Rubber, presented the views by a contest winner for a large plant, the Mishawaka, Ind., plant of this company; and John S. P. Wilson, Jr., The B. F. Goodrich Co., Miami, Okla., gave the views of a winner in the contest for a small plant.

The next portion of the program concerned current government measures affecting safety in the rubber industry. The discussions were lead by Mr. Andrews, and participants were Glen D. Cross, safety director, Firestone, Akron, O.; J. T. Kidney, safety director, Goodyear Tire & Rubber Co., Akron; and W. E. McCormich, department of industrial hygiene and toxicology, Goodrich, Akron.

A luncheon was held by the executive committee of the Rubber Section on October 18 at the Stevens Hotel.

At the second session R. A. Bullock, personnel director, Corduroy Rubber Co., Grand Rapids, Mich., chairman of the nominating committee gave his report, and the following officers were among those elected for the 1950-51 term: general chairman, S. A. Wright, Inland Mfg. Division, General Motors Corp., Dayton, O.; vice chairman in charge of program, G. H. Burkhardt, General Tire & Rubber Co., Akron; secretary, R. M. Boyles, Midwest Rubber Reclaiming Co., East St. Louis, Ill.

Following the election of officers, George W. Harper, associate professor of mechanical engineering, University of Illinois, gave an informative lecture on "A New Look in Industrial Safety." The paper graphically demonstrated the essentials of a sound safety program.

R. R. Meig, Liberty Mutual Insurance Co., presented a paper on the "Medical Aspects of Accident Prevention" in which the complex factors of this problem were brought out, and the difficult and detailed aspects were handled in an interesting and informative manner.

"Three-Component" Rubber Tree

FOR years the possibility of development of profitable farm and plantation rubber growing in the American tropics has been clouded by the South American leaf blight, highly destructive to the improved strains of the rubber trees. Prospects for this development are now brightened by a new method of using plant material and production practices developed by scientists of the United States Department of Agriculture with the assistance of specialists from several South and Central American countries.

The key to the new method is what the Division of Rubber Plant Investigations calls the "three-component" tree, a development that represents a radical change from standard propagating practices used in the Far Eastern *Hevea* plantations. According to E. P. Imle, of the Division's Costa Rica branch, this triple-tree is built up by base budding of seedlings with high-yielding strains, and later top budding at a height of six feet with leaf-blight resistant material to form a resistant crown. Present trees must be sprayed to be kept free from blight, but *Hevea* trees grow far above the ordinarily profitable spray height. The new tree with its blight resistant top cover promises to eliminate that disadvantage.

P-80 Rubber Lubricant

A NEW product, P-80 Rubber Lubricant, designed for use in die cutting of rubber and similar operations, has been developed by International Products Corp., Trenton, N. J. The material emulsifies readily with water, and the resulting emulsion can be applied to rubber surfaces to make them very slippery. As such, the emulsion is useful as a lubricant in the assembly of rubber components, machining of soft and hard rubber and plastics products, and other operations. The new lubricant is said to be harmless to hands and equipment and will not swell or deteriorate rubber.

Additional Experimental GR-S Polymers and Latices

ADDITIONS to the list of experimental GR-S dry polymers and GR-S latices, available for distribution to rubber goods manufacturers under the conditions outlined in our November, 1945, issue, page 237, appear in the table below.

Normally, experimental polymers will be produced only at the request of the consumers, and 20 bales (one bale weighs approximately 75 pounds) of the original run will be set aside, if possible, for distribution to other interested companies for their evaluation. The 20 bales, when available, will be distributed in quantities of one bale or two bales upon request to the Sales Division of Rubber Reserve, or will be held for six months after the experimental polymer was produced, unless otherwise consigned before that time. Subsequent production runs will be made if sufficient requests are received.

These new polymers are experimental only, and the Office of Rubber Reserve does not make any representations or warranties of any kind, expressed or implied, as to the specifications or properties of such experimental polymers, or the results to be obtained from their use.

X-Number Designation	Manufacturing Plant	Date of Authorization	Polymer Description
X-594 GR-S	General, Baytown	7-10-50	Mixture of 50 ± 2 parts Philback 0 and 100 parts GR-S-type polymer, polymerized at 41° F. Sodium lignin sulfonate, Dresinate 214, and lignin used in carbon black slurry make-up. Butadiene/styrene charge ratio 85/15; activated with cumene hydroperoxide, diisopropyl benzene hydroperoxide, or mixture of both. Emulsified with Dresinate 214 and K-ORR soap; shortstopped with DNCB. Shortstopped Mooney viscosity (ML-4 at 212° F.), 36 ± 5. Stabilized with 1.5% PBNA.
X-600 GR-S	Copolymer, Baton Rouge	8-16-50	Same as X-478 GR-S, except butadiene/styrene charge ratio 90/10, and activated with cumene hydroperoxide, diisopropylbenzene hydroperoxide, or mixture of both. Mooney viscosity (ML-4 @ 212° F.), 38 ± 5.
X-601 GR-S-SP	U. S. Rubber, Naugatuck	9-1-50	Butadiene/styrene charge ratio 90/10 polymerized at 41° F. Activated with cumene hydroperoxide. Emulsified with K-ORR soap; shortstopped with sodium dimethyl dithiocarbamate. Mooney viscosity (ML-4 @ 212° F.), 55 ± 7. Stabilized with 1.25% BLE. Glue-acid coagulation.
X-478 GR-S	Copolymer, Baton Rouge	7-26-50	Mooney viscosity changed to read 52 ± 6 (ML-4 @ 212° F.).
X-595 GR-S	U. S. Rubber, Borger	9-1-50	A mixture of 55 parts Philblack 0 and 100 parts of a GR-S polymerized at 41°F. Marasperse plus NaOH used in carbon black slurry make-up. Butadiene/styrene charge ratio 75/25, adjusted to give 20 ± 1% bound styrene on the polymer. Activated with cumene hydroperoxide; emulsified with Nilox potassium soap; shortstopped with hydroquinone. Shortstopped Mooney viscosity (ML-4 @ 212° F.), 50. Stabilized with 1.5% BLE.
X-596 GR-S	General, Baytown	8-17-50	A mixture of 50 ± 2 parts Philblack A and 100 parts of a GR-S polymerized at 41° F. Sodium lignin sulfonate and lignin used in carbon black slurry make-up. Butadiene/styrene charge ratio 71.5/28.5. Activated with cumene hydroperoxide, diisopropylbenzene hydroperoxide, or mixture of both. Emulsified with Dresinate 214 and K-ORR soap; shortstopped with DNCB. Shortstopped Mooney viscosity (ML-4 @ 212° F.), 36 ± 5. Stabilized with 1.5% PBNA.
X-597 GR-S	General, Baytown	8-14-50	A mixture of 50 ± 2 parts Philblack 0 and 100 parts of a GR-S polymerized at 41° F. Sodium lignin sulfonate, Dresinate 214, and lignin used in carbon black slurry make-up. Butadiene/styrene charge ratio 71/29; activated with diisopropylbenzene hydroperoxide. Emulsified with Dresinate 214 and K-ORR soap; shortstopped with DNCB. Shortstopped Mooney viscosity (ML-4 @ 212° F.), 37 ± 5. Stabilized with 1.5% PBNA.
X-598 GR-S	General, Baytown	8-14-50	A mixture of 50 ± 2 parts Philblack 0 and 100 parts of a GR-S polymerized at 41° F. Sodium lignin sulfonate, Dresinate 214, and lignin used in carbon black slurry make-up. Butadiene/styrene charge ratio 71.5/28.5. Activated with cumene hydroperoxide, diisopropylbenzene hydroperoxide, or mixture of both. Emulsified with Dresinate 214 and K-ORR soap; shortstopped with DNCB. Shortstopped Mooney viscosity (ML-4 @ 212° F.), 36 ± 5. Stabilized with 1.5% PBNA.
X-599 GR-S	Goodyear, Houston	8-16-50	Butadiene/styrene charge ratio 71/29, polymerized at 41° F. Activated with cumene hydroperoxide, diisopropylbenzene hydroperoxide, or mixture of both. Emulsified with Dresinate 214; shortstopped with DNCB. Shortstopped Mooney viscosity (ML-4 @ 212° F.), 52 ± 6. Stabilized with 1.25% PBNA.

Calcium Carbonates Useful

A TALK on "Saving Money with Calcium Carbonates," by Vic Vodra, Wyandotte Chemicals Corp., highlighted the October 26 dinner-meeting of the Northern California Rubber Group. Some 59 members and guests were present at the meeting, which took place at the Elks Club, Berkeley, Calif.

Using films and slides to illustrate his talk, Mr. Vodra pointed out that many grades of calcium carbonates can be used to give different desired properties to compounded rubber. Grading of these carbonates, usually done on the basis of particle size, range from the coarse ground limestones to the fine precipitated carbonates. The coarse materials stiffen rubber; while the fine grades have a reinforcing effect. By taking advantage of this reinforcing value it is possible to make scarce rubber go farther by increased loadings, Mr. Vodra declared. Carbonates having particles 0.1-micron and smaller in size impart increased tensile strengths and improve tear resistance. Carbonates can be used advantageously in white and colored rubber stocks, and grades having a particle size of 0.2-0.5-micron have the greatest hiding powder.

The meeting was designated as past chairmen's night, and all seven past chairmen of the Group were present in addition to 20 charter members. Short talks were given by each of the past chairmen, as follows: 1943—Herman Jordan, E. I. du Pont de Nemours & Co., Inc.; 1944—Leonard Boller, now of West Coast Paints, Inc.; 1945—Russell Kettering, Oliver Tire & Rubber Co.; 1946—Lynn Shaeffer, American Rubber Mfg. Co.; 1947—George Farwell, Goodyear Rubber Co.; 1948—Ross E. Morris, Mare Island Naval Shipyard; and 1949—W. Don Good, American Rubber.

In the business session preceding the talks, R. J. Henderson, American Rubber, and Mr. Good reported that the Group's annual Christmas party will be held on December 11 at the Willows, Orinda. Mr. Farwell reported that the annual golf outing will be held on November 16 at Tilden Regional Park, Berkeley. The meeting concluded with a drawing for door prizes contributed by each of the past chairmen and won by the following: Mr. Henderson; C. Churchill, Sterling Rubber Co.; F. Swain and R. Gray, both of Pioneer Rubber Mills; E. Lycett, Goodyear Rubber; D. Payne, American Rubber; and E. Foubert, Sacoma Mfg. Co.

A. C. S. Photocopying Service

EFFECTIVE January 1, 1951, the photocopying service of the American Chemical Society will be extended to include all subscribers to *Chemical Abstracts*, both domestic and foreign, and will no longer be limited to Society members. Through the service it is possible to obtain photoprint or microfilm copies of any article in a periodical or book available in this country. This includes the full text of many papers printed in foreign journals and summarized in *Chemical Abstracts.*

Users of the service purchase coupons at $1.10 each, or $11 for a book of 10, from the Society, 1155 Sixteenth St. N.W., Washington, D. C. In service value, one coupon is good for 10 photoprint or 50 microfilm pages or fraction thereof from any article in a single volume of a periodical or book. Each coupon serves as an order blank and is sent directly to Bibliofilm Service U.S.D.A. Library, Washington 25, D. C.

NBS Selects New pH Standards

FOUR new pH standards, intended to provide fixed points at the upper and lower ends of a standard pH scale, have been selected by chemists of the National Bureau of Standards, Washington, D. C. The new solutions extend the accuracy of standard scales made to conform with the three middle-range standards distributed by the Bureau to the chemical industry.

In a recent study at the Bureau on inaccuracy at the ends of the practical pH scale, 41 solutions of possible value were studied, and the following four standards selected: (1) a mixture of sodium bicarbonate and sodium carbonate, both at 0.025 molar concentration, with a pH of about 10 at room temperature; (2) an 0.01 molar solution of trisodium phosphate with a pH of about 11.7; (3) a saturated solution of potassium hydrogen tartrate with pH of about 3.6; and (4) an 0.01 molar solution of potassium tetroxalate with pH of about 2.1.

Although the new standards lengthen the accurate portion of the pH scale in both directions, the measured pH of high acid and highly alkaline solutions must still be assigned an uncertainty of at least ±0.03 unit. Standard samples of the new solutions will be issued by the Bureau as soon as adequate supplies are available.

NEWS of the MONTH

Second Senate Preparedness Subcommittee Report Issued; Industry Indicates Probable Minimum Synthetic Product Content

The Senate Armed Services Preparedness subcommittee headed by Lyndon B. Johnson of Texas issued its second report on November 21. "Some progress toward more realistic attitudes about both rubber and surplus property disposal" were found, but the subcommittee still thought the rubber situation was "far from satisfactory." Intensive effort on natural rubber procurement, truly effective rubber controls properly administered, more participation of small business in the synthetic rubber program, accelerated research on synthetic rubber, more attention to natural rubber production in the Western Hemisphere, and the development of more rubber feedstock supplies were among the points stressed in this second report.

William O'Neil, president of The General Tire & Rubber Co., offered the government a "quite revolutionary" development in synthetic rubber production guaranteed to increase, at least 22 and up to 30%, GR-S output of existing plants at no appreciable extra cost, in return for some "compensation" and complete "patent protection" by the government. In late November no details of the process had been disclosed, and the matter was being discussed by lawyers from the company and the government.

The Reconstruction Finance Corp. on November 16 reported on the progress in synthetic rubber plant reactivation. Three power talks among occupation powers of Western Germany were in progress in London during November regarding possible reactivation of German synthetic rubber plants in the western zones of occupation.

Industry leaders continued to urge increased synthetic rubber use and natural rubber stockpile accumulation at a rate not detrimental to rubber goods production. R. P. Dinsmore, vice president, Goodyear Tire & Rubber Co., provided figures on probable minimum safe synthetic rubber use in both transportation and non-transportation products beginning in 1951.

More fifth round wage increases were granted workers in the rubber goods industry.

Washington Report

ARTHUR J. KRAFT

Second Preparedness Subcommittee Report

The Senate Armed Services subcommittee, headed by Senator Johnson, issued its second report on surplus property disposal and rubber on November 21. In general, the fire and brimstone which characterized much of the first report were reduced to a few sparks in this supplementary document.

This time the subcommittee found "some progress toward more realistic attitudes about both rubber and our surplus disposal policy" replacing the "siesta psychology" which it charged had prevailed in regard to both programs.

Since the first report was issued in early September, the subcommittee has been "greatly encouraged by developments" in rubber preparedness. It singled out for particular praise the program approved by President Truman and inaugurated by the National Security Resources Board and other agencies, "substantially equivalent to the program proposed by the subcommittee."

It found the rubber situation, however, "far from satisfactory." Industry stocks of all types of rubber, it said, are low, "far less than those on hand at the time of Pearl Harbor. Manufacturers have formed the habit—a habit of doubtful wisdom—of carrying short supplies of natural rubber, relying on synthetic rubber to meet temporary peaks in demand.

"For its own protection—and, more important, for the protection of the nation—industry must not minimize the dangers in the precarious natural rubber supply situation," the report warned. "While there is still time, industry, as well as government, must pursue an aggressive program for acquiring natural rubber supplies from the countries of Southeast Asia."

These supplies, the Johnson subcommittee said, "must be cautiously dispensed so that improvident use will not dissipate them." It called for "truly effective allocation, specification and inventory regulations." The report disclosed that "some time in the first quarter of 1951" The National Production Authority intends to cut still further natural rubber use for non-military purposes to a level approaching 35,000 tons a month.

The subcommittee, furthermore, had some sharp words for the administration by the Commerce Department of the R-1 amendment of August 25, aimed at reducing consumption of new rubber to 90,000 tons a month for the last four months of 1950, and a warning to make future administration conform with "professed policies."

"The Department of Commerce," it said, "must learn to say 'no' just as rubber manufacturers must expect 'no' as an answer to their pleas for more rubber if the choice is between non-essential rubber products and rubber for the national defense stockpile."

The report declared also that "the subcommittee recognizes fully the place of small business in our national economy and strongly urges the NPA to insure that any limitation order deals fairly and equitably with companies in this category."

The subcommittee was particularly disturbed with "our present extreme shortage of feedstocks for the synthetic program"—called it a "direct challenge to private industry." Failure of industry to build additional facilities—particularly for benzol—"will leave no choice but government construction."

The subcommittee also discussed these topics:

1. *Rubber Needs of Our Allies.* It recommended "intensive cooperation between friendly nations and the United States" to "produce substantial and vitally needed savings in the use of our natural rubber."

Specifically, it recommended substitution by our allies of synthetic rubber for natural rubber to help speed the acquisition of our stockpile. It used harsh words in commenting "on the fact that the nationals of friendly nations, made more secure by our mobilization program, are obviously taking advantage of the tight situation created by our and their national emergencies to sabotage the preparedness effort by gouging unmercifully on their sales of rubber . . . What we would freely give for foreign aid and mutual assistance we would not have extorted from us."

2. *Rubber Research.* It emphasized the "urgent importance of continuing and accelerating our rubber research." It was "gratified' to hear from the RFC that one-fourth of its expanded research budget is devoted to fundamental research.

"Private industry and government working together should be able to overcome the problem of expanding synthetic rubber's usefulness," the subcommittee stated.

3. *Domestic and Western Hemisphere Production of Natural Rubber.* It took issue with the Munition Board's contention that guayule seed is being stockpiled and that manpower requirements for growing guayule "are extreme." It urged "substantial nursery plantings" of guayule seed immediately, quick accumulation of an adequate reserve stock of seed, and the immediate inauguration of a more formidable guayule production program.

The subcommittee was extremely enthusiastic about the prospects of developing an economically feasible guayule production program in the Southwest, making a rubber "in quality approaching *Hevea* rubber" and able to "compete successfully on a world market of 30¢ a pound for #1 RSS."

"Guayule production here should be accompanied by a simultaneous expansion of planting of *Hevea* rubber in Latin America, carried on under a cooperative program with the tropical American countries," it said.

4. *Increasing Rubber Feedstock Supplies.* "Benzol presents by far the most acute shortage problem," it was said. The subcommittee cited a Commerce Department report to the subcommittee stating that the "possibilities of obtaining benzene from petroleum in less than a year by any one or combination of several processes offers a distant opportunity for new supplies in a comparatively short period." This question is being handled by NPA's chemicals branch and a special industry advisory committee.

It noted a recent RFC contract to buy 113,289,780 gallons of alcohol from France for delivery next year, but urged expansion of domestic facilities to end dependence on foreign sources.

5. *Progress in Reactivation of Synthetic Rubber Plants.* The subcommittee proclaimed its interest in seeing that "medium-sized and small business, on the basis of merit, is given an adequate opportunity to participate in the synthetic rubber program."

In this connection it has been learned that RFC has formally suggested that

each of the larger-scale operators of government plants agree to take in one or more small companies as participants in its operation. This request was prompted, reportedly by the Justice Department, but the Preparedness subcommittee's report makes it evident that it, too, favors such action.

In late November the program had been instituted only at the Los Angeles copolymer plant where Minnesota Mining & Mfg. Co., is the contractor primarily responsible for producing the rubber, but operates the plant jointly with Pacific Rubber Co.

RFC reports that other operators have shown a "very cooperative attitude" toward its request, but has reported no immediate acceptances of the proposal. The idea prompting it is that companies other than the major operators will have the "know how" in making synthetic rubber when the government decides to lease or sell the plants to private industry.

NPA Rubber Activity

Activity on the controls front saw no new developments during November. NPA, after setting limitations on consumption of new rubber and on natural rubber for November and December, was busy primarily on other fronts, making similar sharp across-the-board cuts in consumption of other raw materials, such as aluminum.

Another rubber order is expected from that agency by January 1. The general assumption is that it will set up specifications for the use of natural rubber in mechanical goods, including automotive rubber products and some others.

NPA has already the recommendations on specifications for tires and tubes and camelback from its technical industry advisory subcommittee representing this branch of the industry. The agency is now reviewing these specifications.

On November 17, NPA met with a similar subcommittee representing the mechanical goods branch and received a set of specification recommendations.

The chief problem besetting NPA's rubber division during November followed from the changeover of jurisdiction over allocation of GR-S and GR-I (Butyl) to that agency from the Office of Rubber Reserve, RFC. Many companies appealed for larger allotments on hardship grounds.

Some of the difficulties arose because of a change in calculating base-period use. The NPA Order M-2 permits a company to calculate its base period using the quantity of new rubber consumed. Rubber Reserve calculated the base period on synthetic rubber purchased from it.

The tire manufacturing industry's report of October 24, reviewed in this space last month, has received no official comment by government agencies. Although presented to NPA, it was directed to the consideration of all government agencies concerned with rubber policy. The report's chief criticism of the government's program was directed at buying natural rubber for the stockpile at a rate exceeding current availability of the material, measured by prospective imports less prospective consumption on an approximate 60:40 synthetic to natural ratio for transportation products.

The report appealed to the government to sit down with industry and thrash out policy and program before it is too late to avoid the "economic chaos in rubber," which the industry said will result from further pursuit of the present stockpiling program.

Despite the lack of official comment, it can be said that the report made little impression on Washington officials. Much of the industry's argument was predicated on the assumption that new rubber consumption will again reach 1,200,000 tons in 1951. Official Washington seriously doubts that this total will be attained, although it will not say how much it thinks consumption will fall.

The reason why the report's criticism and appeal for review of policy is being ignored is that the government's rubber program is based on only one consideration: The nation is not prepared rubberwise for war; it is already late in getting prepared; it must continue the announced policy in order not to lose any more ground.

Nothing has happened in recent weeks (and that includes the industry report) to alter the primary decision to get prepared with utmost speed.

CALENDAR

Dec. 15. New York Group. Christmas Party. Henry Hudson Hotel, New York, N. Y.
Boston Rubber Group. Christmas Meeting. Somerset Hotel, Boston, Mass.
Chicago Rubber Group. Christmas Party and Ladies' Night. Morrison Hotel, Chicago, Ill.

Dec. 16. Southern Ohio Rubber Group. Dinner-Dance. Miami Valley Golf Club, Dayton, O.

Dec. 19. Buffalo Rubber Group. Elks Club, Buffalo, N. Y.

Dec. 20. New York Section, SPE. Christmas Party. Hotel Shelburne, N. Y.

Jan. 10. Newark Section, SPE. Military Park Hotel, Newark, N. J.
Chicago Section, SPE, and Chicago Chapter, SPI. Builder's Club, Chicago, Ill.

Jan. 18. Quebec Rubber & Plastics Group. Queen's Hotel, Montreal, P.Q., Canada.

Jan. 18-20. SPE. National Technical Conference. Hotel Statler, New York, N. Y.

Jan. 21-25. Nat'l Sporting Goods Assn. Twentieth Annual Convention and Show. Morrison Hotel, Chicago, Ill.

Jan. 26. Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.
Chicago Rubber Group. Morrison Hotel, Chicago, Ill.

Feb. 2. Akron Rubber Group. Mayflower Hotel, Akron, O.

Feb. 6. The Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.

Feb. 14. Newark Section, SPE. Military Park Hotel, Newark, N. J.
Chicago Section, SPE, and Chicago Chapter, SPI. Builders' Club, Chicago, Ill.

Feb. 21. New York Section, SPE. Hotel Shelburne, New York, N. Y.

Feb. 23. Quebec Rubber & Plastics Group. Ladies' Night. Town of Mount Royal Community Hall, Montreal, P.Q., Canada.

Feb. 28-Mar. 2. Division of Rubber Chemistry, A. C. S., Shoreham Hotel, Washington, D. C.

Mar. 6. The Los Angeles Rubber Group, Inc. Hotel Mayfair, Los Angeles, Calif.

Mar. 9. Chicago Rubber Group. Morrison Hotel, Chicago, Ill.

The objectives implementing that decision have been communicated to other agencies, including NPA, by the National Security Resources Board. The latter has set the objectives and has instructed NPA and others to implement them. NPA's M-2 Order cutback, swift and sharp, in natural and total new rubber consumption for November and December is such a step.

Any modification of the principal objective of current preparedness policy in rubber—rapid accumulation of a large natural rubber stockpile—is virtually ruled out by the firm conviction of NSRB's chairman, W. Stuart Symington, that the objective is sound and necessary.

The stockpile target is now generally estimated at 1,500,000 tons, and the target date at late 1951 or soon thereafter. Previous estimates had placed the goal at 1,000,000 tons. If a protracted war of attrition in Southeast Asia is what is in store, stockpile buying may well continue even beyond a specific tonnage target.

General Tire GR-S Increase Proposal

In a letter to RFC Chairman W. Elmer Harber, dated November 7, General Tire President O'Neil, proclaimed a "quite revolutionary" development by his company in synthetic rubber production.

He promised that if applied to the government's synthetic rubber program, this development will not only increase the supply of GR-S, but also reduce the cost entailed in the reactivation program.

The development can be put into effect at once, he said. Using neither additional plant facilities nor additional quantities of basic materials, such as butadiene and styrene, it would immediately yield a 22% increase in GR-S output, with further increases up to 30% in several months and perhaps more later.

O'Neil offered this development to RFC in return for some compensation. In the letter, and again in a three-hour conference with Harber, Rubber Reserve officials, and representatives of other government agencies, on November 15, O'Neil stated his desire that RFC suggest means for handling the matter.

As for General Tire, he said, it would insist on these conditions: (1) That RFC guarantee protection of the company's patent rights. (2) That RFC make some arrangement for compensation.

O'Neil's letter stated that General Tire would be "content to take a substantial portion of the saving in rubber" instead of a dollar and cents royalty. "After a certain amount (of rubber) has been obtained by us, we will let the patent be free for government use in government plants or any plants they sell—this to be confined to the United States. This arrangement also does not apply to export or material that could be exported."

It has been reported that O'Neil asked RFC to permit the exclusive use of the development for the time in the Baytown, Tex., copolymer plant operated for RFC by General Tire. This point is what O'Neil meant in stating his willingness to take a "substantial portion of the saving in rubber." The proposal boils down to patent protection for General, in all possible foreseen and unforeseen uses, including, but not confined to rubber processing, and a financial royalty for the use of the patent in government rubber plants.

The complete story on what is involved in the proposal is still a mystery to everyone here, and that includes government participants in the discussion with O'Neill. General Tire has not yet applied for patents on its development; it has not disclosed its character to RFC, beyond stat-

ing that it is in the nature of an extender, which improves instead of degrades rubber product quality, including that of products made with cold rubber. General Tire informed officials that the extender ingredient is produced in this country in ample quantity and at low cost.

The November 15 discussions ended in agreement to turn the question over to attorneys of RFC and General Tire, before resumption of further negotiations. Attorneys for the company were asked to bring back answers to half a dozen questions put by RFC. The issue at this writing (November 20) is still very much up in the air. There have been no commitments by either party.

The patent question is at the heart of the matter. It is this problem that the lawyers are investigating. RFC and its contract operators of synthetic rubber plants are parties to an agreement making any technical development in a government plant available for the use of all. General Tire is the only operator not party to the agreement; it has consistently refused to join.

RFC is concerned lest it grant General Tire a reward for some development which is already covered by patents freely available to the government or to which it might be entitled anyway. Assuming that the lawyers agree that neither of these situations is involved, RFC still has the question as to whether it can or should assure General Tire the broad patent protection it asks. The company has stated that its development might have widespread uses in many fields, including rocket fuel and others which may some day yield far greater profit.

Company officials took the development to RFC some eight months ago with a proposal that General Tire be permitted to finish work on it at a government copolymer plant. RFC told the company that this procedure would make the development freely available to RFC, and that General Tire could expect no special exemption from the exchange of technical developments agreement existing through research contracts for work in government plants.

The company then appealed to the Canadian Government and finished its development at the Sarnia, Ont., copolymer plant, it has been reported.

In the event it cannot work out a satisfactory deal with RFC, the company has informed the government that it will use the development for making synthetic latex and polyvinyl chloride at its own plant being constructed at Jeannette, Pa. General Tire is putting $5,000,000 into its new synthetic plant, using power and steam available from an adjacent plant of Pennsylvania Rubber Co., a General Tire subsidiary.

General Tire anticipates some, if not considerable, difficulty in acquiring scarce butadiene for a private operation. This fact has probably had some influence on its decision to offer the development to RFC.

O'Neil, writing to Harber, said General Tire would make the rubber and use it "if we had our own synthetic plant—which we have started to build and will not be ready for six months. . . . However," he added later in this letter, "since natural rubber is 70¢ a pound, and may go higher, we are suggesting that we offer this to government . . . the extra price (of natural) is costing $50,000,000 a month and the announcement of success of a negotiation to increase the synthetic output 22% will save you $25,000,000 a month within a week."

It has been pointed out that the government knows many ways to stretch synthetic rubber production, although all require the use of some additional feedstocks.

Abstracts of O'Neil's letter to Harber were printed widely in the press November 11 to 15. RFC rarely issues press announcements, generally reserving them to announce major decisions and accomplished facts. Therefore the issuance of the following release on November 16, the day after the Harber-O'Neill talk, for publication in the widely read papers of the following Sunday, is of more than casual interest:

"The vice chairman of the Reconstruction Finance Corp., C. Edward Rowe, announced today that substantial progress has been made by the RFC and the rubber and petroleum industry in carrying out the program to increase the production of synthetic rubber to meet defense requirements.

"Mr. Rowe stated that two of the largest plants which were in 'standby' have already been reactivated and are in operation in Texas. Three other plants in California are expected to go into production in approximately two weeks. In addition two plants in Kentucky, one in Ohio, and one in Pennsylvania will go into operation at about the same time. It is anticipated that shortly after the first of the year one plant in West Virginia, and two in Louisiana will commence production.

"Mr. Rowe stated that the general-purpose synthetic rubber facilities of the government in January of this year were producing at an annual rate of 220,000 long tons. The production has now been stepped up to a rate of 430,000 long tons. It is expected that by the first of the year the production will exceed 600,000 long tons annually and that in the early spring the goal of 760,000 long tons established by the President will be attained.

"Two of the reactivated plants will use alcohol as the basic raw material. Use of these plants which have been shut down since after the close of World War II is necessary because the projected requirements are in excess of the capacity of the plants designed to use petroleum products. The operation of these alcohol plants is necessary to carry out the reactivation program and the facilities are being used even though the cost of production is higher than that in petroleum plants.

"Mr. Rowe stated that when the reactivation program is completed, all the government-owned synthetic facilities capable of operation will be in production."

The two reactivated plants now in operation in Texas are the Port Neches copolymer plant of 60,000 tons' design capacity operated by United States Rubber Co. and the Houston butadiene plant of 50,000 tons operated by Sinclair Rubber, Inc.

The three plants in California are the 60,000-ton Los Angeles copolymer plant operated jointly by Minnesota Mining and Pacific Rubber; the butane plant at El Segundo, operated by Standard Oil Co. of California, and the Torrence butadiene plant operated by Shell Chemical Corp. California Standard will make only butane feedstocks and supply these to Shell at Torrence. All 45,000 tons of butadiene, the design capacity, will be made by Shell.

The two Kentucky plants are the 30,000-ton Louisville plant, operated by Kentucky Synthetic Rubber Co., and the Louisville alcohol butadiene plant operated by Carbide & Carbon Division of Union Carbide Corp.

The West Virginia plant is the 90,000-ton Institute copolymer plant operated by The B. F. Goodrich Co. The two plants in Louisiana are a butadiene and a butyl plant.

German Synthetic Rubber

Three power talks among the occupation powers of Western Germany were in progress in London, England, during November regarding possible modifications of the Intergovernmental Agreement on Prohibited and Limited Industries of April, 1949.

Permission to revive synthetic rubber production in Germany was among the subjects discussed. Great Britain was reported strongly opposed to granting such permission. The United States went into the discussions, according to the best available reports, uncommitted on the issue. France is the other participant.

The deteriorating world political situation since the outbreak of the Korean war in the last week of June did not prompt the discussion. The groundwork for the intragovernmental consideration of restoring a synthetic rubber industry in Western Germany was laid shortly before the Korean outbreak.

Government officials here report that Western Germany, if given approval to produce synthetic rubber, could scarcely hope to make more than 20,000 tons a year with present plant capacity. Wartime German production was about 105,000 tons, but about half of this was produced in Eastern Germany, now the Soviet zone of occupation.

Substantial tonnages were made in parts of Germany now part of Poland. Production of at least 60,000 tons a year is being pressed in East Germany. Some Western zone plants have been dismantled, and the only facility capable of reactivation in West Germany today is in the British zone.

It is also reported that German Buna S synthetic rubber, based on the use of acetylene, costs two to three times as much to make as American synthetic rubber and therefore would be uneconomic should the price of natural rubber fall to a closer parity with U. S. synthetic.

The London discussions were still in progress on November 20, with no decision on the German synthetic question. Aside from former German managers of the industry, public support for revived production has come from the Firestone Tire & Rubber Co.

NPA Meeting on Carbon Black

The NPA's chemicals division will meet with producers of carbon black shortly to determine what steps should be taken to assure adequate supplies of furnace blacks for expanded production of synthetic rubber.

No meeting date had been set at this writing (November 20), but NPA intends to call it for December or January. The meeting will review much basic data brought together by the NSRB, which thoroughly studied the carbon black industry during the past summer. This study was made by a group headed by Harvey Titus, Carbon Black Export Association, as a consultant to NSRB.

Chief topic slated for discussion is whether government "certificates of necessity" should be used to help underwrite the expansion of furnace black producing facilities. Four companies have applied for such certificates, provided for in the Defense Act of 1950.

Total production of carbon black is considered ample to meet all requirements, but temporary dislocations are expected in supplies of furnace blacks required for synthetic rubber. It is to ameliorate or

avert these dislocations that the meeting has been called.

Names of the industrialists who will consult with NPA's chemicals division have not been made public. Those who have been consulted by NSRB in its carbon black study are expected to participate. Charles G. Concannon, veteran administrator in the Commerce Department's chemicals division, is expected to head the NPA participants.

NSRB made its study on behalf of the Munitions Board, following an appeal by channel black producers for government stockpiling of this product. The appeal was submitted a year ago when sales prospects were bleak for the coming year, and producers feared shutdown of facilities was the only course open to them. Because the supply-demand picture has changed so radically since then, stockpiling has been ruled out as unnecessary.

A case now before the United States Supreme Court is conceded here to have an important bearing on the price that consumers of natural gas—an important cost element in producing carbon black—will have to pay in the future.

Oklahoma and Kansas state regulatory commissions have fixed minimum prices for gas at the field. The minima apply to the Hugoton field, the world's largest, traversing the borders of these two states and Texas.

In both cases these minimum prices are about double the prevailing price at the field. They were set to prevent wastage and encourage conservation.

Phillips Petroleum Co. and Cities Service Gas Co. are contesting the Oklahoma decision, upheld by that State's highest court. Argument was held early in November, and a decision is expected during the coming year.

The emergence of a vast, fast-expanding continental network of natural gas pipelines, moving gas to cities throughout the land for heating purposes, has already brought an end to cheap gas for carbon black producers. It is no longer abundantly available as a waste product of oil production, except in some few localities, where pipelines are or soon will be also in operation.

Other states with important natural gas reserves are almost certain to follow the lead of Oklahoma and Kansas if the high court rejects the Phillips-Cities Service appeal. Such action would mean, in all probability, permanently higher prices for the chief raw material of the carbon black producers.

Collyer on 1951 Outlook

John L. Collyer, Goodrich president, in a talk before the annual convention of National Association of Independent Tire Dealers, Inc., in early November, said that on the basis of the National Defense Program for 1951 the rubber industry should be able to supply all military and essential civilian rubber product needs in the coming year without alarming shortages. This picture could be changed, however, by fresh outbreaks in the natural rubber producing areas of the Far East or by all-out war.

He said that the nation's economy will be on a wartime or a preparation-for-emergency basis for a long time and advocated a seven-point program to attain rubber security as soon as possible for the United States. His recommendations called for:

(1) Rapidly increase the output of American synthetic rubber from the current rate of 570,000 tons a year up to the authorized rate of about 920,000 tons.

(2) Increase usage of synthetic rubbers as rapidly as they become available.

(3) Add any excess production of synthetic rubber to the government's working inventory, up to a reasonable limit, as protection against damage or dislocation of rubber-producing facilities.

(4) Government should exchange with foreign countries any remaining excess production of American synthetic rubber for natural rubber.

(5) Government should make efforts to prevent sales of natural rubber to Russia. Purpose of present limitation program placed on consumption of natural rubber in the United States is to make more natural rubber available for our own strategic stockpile.

(6) Government should accumulate natural rubber in the strategic stockpile, but only to the extent justified by a careful study of our probable military and essential civilian requirements for an extended emergency. A study should be made of the possible effect upon the economics of own own and other nations if we accelerate our stockpile purchases rapidly and then cut them off abruptly.

(7) Congress should complete a study promptly on the question of whether the continuance of the present government monopoly in general and special-purpose rubbers is in our long-range national security interests.

In another statement toward the end of November, Mr. Collyer said that production of American synthetic rubbers should reach an annual rate of 925,000 long tons early next year which will permit a reduction of crude natural rubber usage of from 35 to 45% from the 1950 level.

The planned increase in output of American synthetic rubbers will permit a stepping up of the percentage use of these rubbers from 50% of the total in December to 55% in January and 60% by March, 1951, with corresponding reductions in natural rubber consumption, it was said.

"Total U.S.A. rubber consumption in 1950 is estimated at 1,240,000 long tons, of which 710,000 will be imported natural rubber and 530,000 tons American synthetic rubbers. Total rubber consumption will be lower in 1951 than 1950 even though military requirements will be higher. Civilian tire demand is estimated to decline, and reduced production of automobiles will require fewer tires for original equipment," Mr. Collyer added.

He pointed out that the United States is the only Atlantic Pact nation which has placed a limit on the consumption of natural rubber.

"If additional natural rubber is needed for the United States stockpile, then our government should interest those nations who are receiving financial and military aid from the United States to adopt the United States program of limiting consumption of natural rubber. Such a program should apply also to Western Germany and Japan," he declared.

Collyer also indicated that there is now enough imported natural rubber and synthetic rubber production capacity within our country's borders to meet military demand for a five-year war and at the same time supply rubber for essential civilian uses.

Litchfield Emphasizes Rubber's Importance

Writing for the annual NAITD yearbook, P. W. Litchfield, chairman of Goodyear Tire, stated that every tire dealer and likewise every tire user in America has a prime stake in the nation's rubber policies as the problem of available supply becomes more acute in the present war crisis as well as in the years of growth ahead.

The price of our basic commodity, natural rubber, is fluctuating violently, the public has been buying tires on a "scare" basis, partial government controls are being formulated, and the size of our national stockpile is a matter of deep concern wherever top militarists gather to discuss global strategy, Litchfield wrote.

"The need and demand for rubber grows, in boom or depression, in war or peace. With a present worldwide potential supply of natural rubber of 2,000,000 long tons annually, a potential which cannot be fully realized, the prospect is that world consumption 10 years hence will be almost 30% in excess of that figure," he said.

"We find ourselves facing two urgent facts," he added. "Our source of supply is precarious and our need for and dependency upon rubber, both militarily and economically, is constantly increasing."

Obvious answers in Litchfield's opinion are capacity production by government-owned synthetic rubber plants and the building up of an inventory of synthetic rubber to a minimum of 200,000 long tons.

In this period of acute crisis, economic and military, direction and operation of our synthetic rubber plants call for close integration which can be had only under continuing government ownership; but when world conditions permit, government can and should dispose of these synthetic plants to private interests so that they may be fitted into our traditional pattern of private enterprise.

Dinsmore on Rubber Supply

R. P. Dinsmore, Goodyear vice president in charge of research and development, discussed "The Significance of Our Rubber Supply" before the Pittsburgh Section of the American Chemical Society on November 16.

The United States, in event war should break out, will require about a million tons of new rubber a year, and in view of the probable large tire demand for both military and civilian use, it would be unsafe to figure a natural rubber consumption less than 25% of this total new rubber. Whatever our stockpile may be, therefore, it is quite likely that we will require another year or two's supply in order to provide enough for a war of four or five years' duration, it was said.

If we accumulate natural rubber at the rate of at least 30,000 tons a month, it will take somewhat over eight months to acquire a year's emergency supply. If we now assume that by the time full synthetic rubber production is available, the demand for rubber will have dropped because of decreased automobile production, and other things, to a million-ton-a-year rate, this would mean that we would have available about 35,000 tons a month of natural rubber and about 75,000 tons a month of synthetic rubber to supply a demand of 83,300 tons a month. The surplus of 26,700 tons a month of synthetic rubber should first be used to build a stockpile of 200,000 tons of synthetic rubber which would represent four months' supply at the million-ton rate, if we were using 35,000 tons of natural and 48,300 tons of synthetic a month. The above consumption would represent 58% synthetic and 42% natural rubber, but this proportion would of course change if either the total

rubber demand should rise or the amount of available rubber should fall.

It is likely to be misleading to talk about the overall industry ratio of natural to synthetic rubber, Dr. Dinsmore said. The extent to which synthetic rubber can be used without serious injury to product quality varies widely with the type of product involved, and, in addition, a safe ratio from a quality standpoint can be fixed only if the proportionate production of the various types of products remains fixed within reasonably narrow limits.

Reasonably good figures have been regularly available with respect to the production of items going into the transportation industry, but since the close of the last war, similar information has not been available for most of the non-transportation items. The non-transportation field uses about a third of the rubber in the industry, and any attempt to reach a conclusion with respect to an overall ratio for synthetic rubber must take into account a fairly detailed distribution among the major non-transportation groups and the probable maximum safe ratio for each group. An attempt to estimate the maximum synthetic rubber content for the various transportation and non-transportation products was given in the following table.

New Rubber Distribution by Products

Transportation	% Total Rubber—Natural and Synthetic	Maximum Ratio Synthetic	% Total Rubber—Synthetic
Product			
Passenger tires	29.8	.80	23.8
Truck tires	18.8	.20	3.8
Tractor & Implement	4.0	.85	3.4
Camelback	2.6	.90	2.3
Passenger tubes	5.0	.95	4.8
Truck tubes	2.3	.80	1.8
Misc. tubes	0.6	.80	0.5
Other misc.	1.9	.40	0.8
Total—Trans.	65.0		41.2
Non-Transportation			
Heavy Mechanical Goods	9.0	.65	5.9
Latex products	7.0	.40	2.8
Extruded goods	3.0	.50	1.5
Molded goods	2.5	.60	1.5
Soles & heels	3.0	.90	2.7
Boots & shoes	2.0	.70	1.4
Wire & cable	3.0	.75	2.3
Flooring	1.5	1.00	1.5
Fabrics, sundries, etc.	2.5	.25	0.6
Hard rubber	.7	.60	0.4
Misc.	.8	.50	0.4
Total—Non-Trans.	35.0		21.0
Grand Total	100.0		62.2

These figures represent as nearly as we know them, Dr. Dinsmore said, the percentage of total new rubber used by each class of rubber product, the maximum ratio of synthetic rubber which can be used without serious detriment to quality in that class, and the product of the two columns which gives the maximum safe use of synthetic rubber represented as a percentage of total new rubber used by industry. Transportation items can safely use 41.2% of the total new rubber as synthetic, and non-transportation items can safely use 21; the sum of the two is 62.2%, which represents the safe ratio overall, as long as the various classes of rubber products are made in approximately the same proportion as in the table.

The reason for the limitation and safe use of the various synthetic rubbers was described and with regard to the cold rubber or low temperature polymer GR-S, it was said that this synthetic equals natural rubber in tire tread wear with ordinary carbon blacks and may be made 15% better than natural rubber with the use of special fine furnace blacks. Heat development in the tire during use is still a serious problem, however, with the fine furnace blacks.

Dr. Dinsmore concluded by emphasizing the short inventories of synthetic rubber and the probable inadequacy in the stockpile of natural rubber, which will be likely to persist for several months. He blamed the government for not moving quickly to meet the increased demand for synthetic rubber, even though this necessity has been apparent since last March.

The management of the rubber problem in Washington is now scattered through a number of agencies, and the difficult coordination at the top is certain to be more or less ineffective because of the numerous other materials similarly situated. The necessity of continued government control has been prolonged because of the state of our natural rubber stockpile and the inadequate GR-S inventory. It is probable that we face control of most basic raw materials for a considerable time to come, he added. An early removal of these two obstacles will leave the way clear to turn synthetic rubber production over to private industry when present stringencies have passed, and it is sincerely hoped that by the expiration of the present Rubber Act, the necessary conditions will have been met, and that this program can be accomplished, he concluded.

Industry Production and Trends

Although it will be the end of the year before the effect of the NPA rubber consumption cutback order on rubber goods production can be recorded in any detail, reports of reduction from seven- and six-day work weeks to about 5½ days in the Akron area and from six- to five-day work weeks outside that area were received. The general trend seemed to be toward a reduction of overtime work in all areas.

Bearfoot Sole Co., Inc., Wadsworth, O., reported that its future earnings and employment for about 450 employes was dependent on its ability to obtain enough synthetic rubber to continue operations.

"From July to October synthetic rubber that was rightfully ours was given to our competitors by Rubber Reserve, which was the allocating and distributing agency for synthetic rubber produced in this country," according to I. B. Calvin, treasurer of Bearfoot Sole.

"We were denied the use of any synthetic rubber produced in the United States between July and October, which penalty was imposed because we obtained synthetic rubber from a friendly nation and customer, Canada, on more favorable terms than we could have obtained it from the RFC," Calvin explained.

With the change in authority for distribution of synthetic rubber from Rubber Reserve to the NPA's rubber division, it is understood that Bearfoot Sole is now able to obtain American synthetic rubber. NPA's allocation is on a base consumption period, not on purchases for RFC only.

Manufacturers' shipments of passenger tires receded in September to 6,975,209 tires from the 9,040,326 shipped in August, a reduction of *22.8%*, according to the monthly report of The Rubber Manufacturers Association, Inc., of November 13.

Production of passenger tires in September totaled 6,620,742 units, down 5.4% from the 6,994,685 made in August. Manufacturers' inventories declined 8.8% to 3,497,333 tires from 3,835,638 units on August 31.

September shipments of truck and bus tires were down 20.3% to 1,251,105 units from the 1,569,230 shipped in August. Production of truck and bus tires was 1.4% higher in September, with 1,194,871 tires made, against 1,178,244 in the previous month. End-of-the-month inventories showed a 4.1% drop to 925,699 units from the 965,643 on hand at the end of August.

Shipments of automotive tubes were off 18% to 7,555,892 units, compared with 9,208,677 tubes shipped in August. Production of tubes totaled 7,073,600, down 2.4% from August, when 7,243,695 units were produced. Manufacturers stocks of automobile tubes amounted to 6,129,401 units, as against 6,619,472 tubes at the end of the previous month.

Consumption of new rubber during September declined to 108,464 long tons, compared with the record 114,676 tons used in August, according to the NPA rubber division report. The use of natural rubber dropped to 59,846 tons from the 64,297 tons used in August, and synthetic rubber used in September amounted to 46,336 tons, compared with 47,950 tons in August.

Consumption of new rubber during October reached an *all-time high of 117,935 long tons*, according to the RMA estimate of late November. Of this total, 67,236 tons were natural, and 50,699 tons synthetic rubber. The reason for this unprecedented consumption figure for October, which should not have been possible under the R-1 Order, as amended August 25, is not clear.

Tire Price Increase

Goodyear on October 25 announced an increase in prices of 7½% on all truck and farm tires, all natural rubber tubes, and all passenger automobile tires, except white sidewall tires, which were raised 10%. There was no change in the price of tubes made of Butyl rubber or of solid or pneumatic industrial tires and tubes, bicycle and motorcycle tires and tubes.

Increased cost of materials including natural rubber, rayon, and cotton were responsible for the increase, the company said.

The Goodyear increase was followed by similar increases by Mohawk Rubber Co., Goodrich Seiberling Rubber Co., and General Tire, and by most other major tire producers.

The list price of the 6.00 by 16 tire will advance from $18.70 to $20.10 with this new price increase. This same tire cost $14.75 a year ago.

FTC Complaint, Cat's Paw Rubber Co.

Price discrimination in the sale of rubber heels, soles, and other products used in the shoe repair industry is alleged in a Federal Trade Commission complaint #5828 against the Cat's Paw Rubber Co., Inc., and its parent corporation, Holtite Mfg. Co., both of Baltimore, Md., on November 17.

Among other respondents charged with price discrimination are two Chicago firms, A. Leveton Co. and K. Kaplan Sons & Co., both wholesalers of shoe repair materials and other products used in the shoe trade.

Cat's Paw, the complaint states, discriminates in price by selling rubber heels, soles, and shoe findings "to some of its customers at substantially higher prices than it sells such products of like grade and quality to others of its customers." These discriminations in price, the complaint adds, are effected by granting dis-

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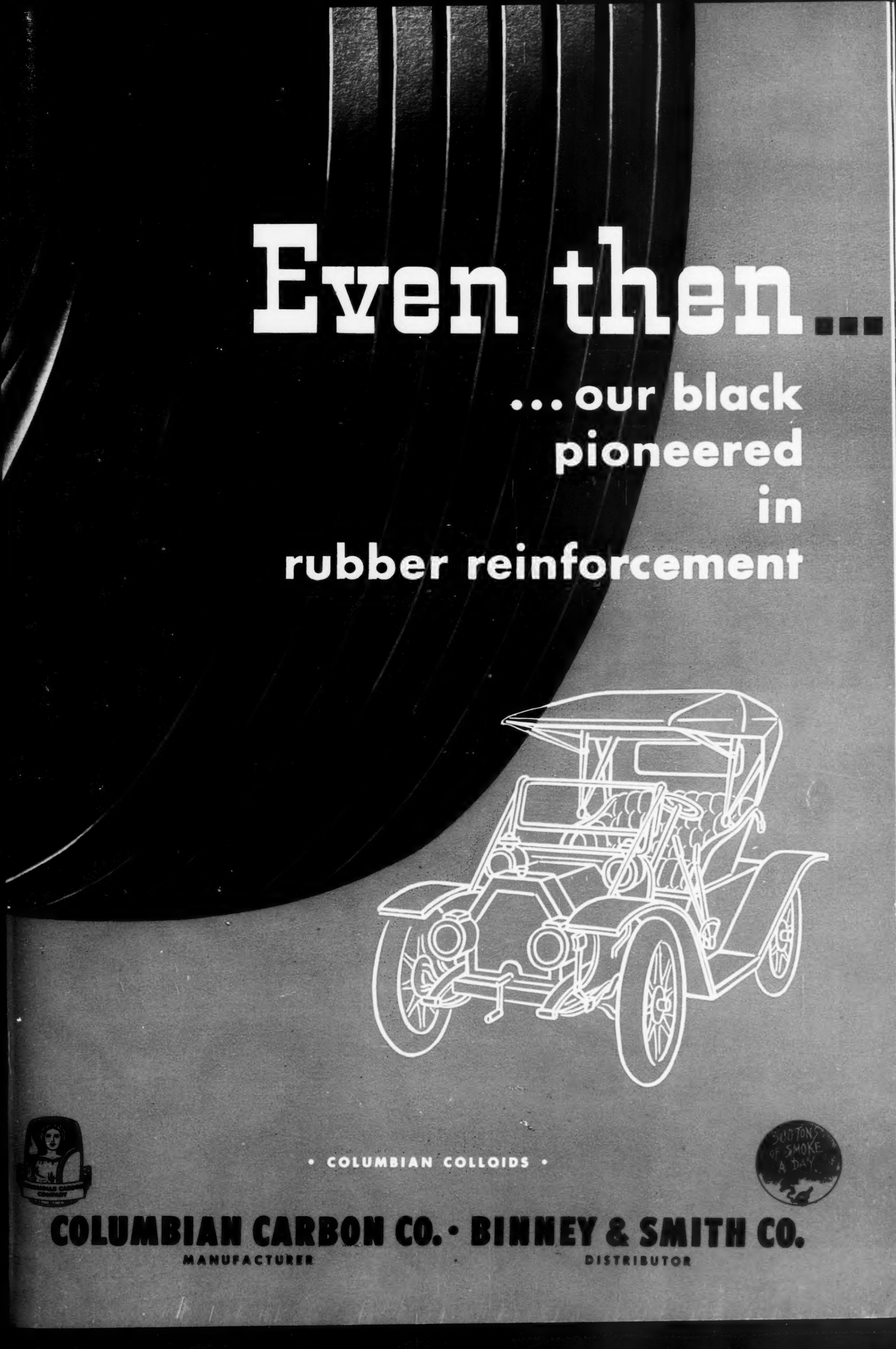
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counts, rebates, and allowances on sales to favored customers, including wholesalers of shoe findings and large operators of chain shoe-repair shops.

According to the complaint, the price differentials vary in amount and range from 1% to approximately 50% and result in reducing the favored customers' prices to a substantially lower amount than the respondents charge others of their customers for shoe findings of like grade and quality. The price discriminations are alleged to be in violation of Section 2 of the Clayton Antitrust Act, as amended by the Robinson-Patman Act.

Individuals cited in the complaint as respondents are Morris Eisen, Larry L. Esterson, and Albert A. Esterson, officers of both Holtite and its wholly owned subsidiary, Cat's Paw. Jack Klinger, who trades as A. Leveton Co.; Rudolph E. Kaplan and Eli E. Kaplan, officers of K. Kaplan Sons & Co., and who, together with I. Gilbert Kaplan, Sidney Kaplan, Rubin Chupack, and Edwin Kardon, are copartners doing business as Reick, Langendorf & Co., Chicago.

The respondents have 20 days in which to answer the complaint. A hearing on the allegations is set for January 8 in Baltimore, with Trial Examiner Frank Hier presiding.

Polystyrene Shortage Protest

Nine hundred plastic injection molders throughout the United States are feeling the shortage of polystyrene plastic molding powder. Approximately one-third of these plastic injection molders face financial ruin because of this shortage.

"Several factors influence this situation," according to Elmer Mills, chairman of the injection molders committee on national security of the Society of the Plastics Industry and president of Elmer E. Mills Corp., Chicago. "Due to the demand for plastics products made from polystyrene raw materials, a tremendous expansion of manufacturing facilities for polystyrene plastic products has recently taken place. Numerous plants have added additional press capacity which requires twice as much polystyrene molding powder as before, while other plants are in the midst of installing additional and larger equipment.

"As allocations for polystyrene plastic raw materials are based on last year's requirements," continued Mr. Mills, "many firms are not receiving enough polystyrene molding powder for their present operations and none for their expanded capacity. New injection molding plants are not receiving any polystryene molding powder because they have no purchasing background from last year."

The growth of the injection molding industry has created an increasingly large demand for polystyrene. Suppliers of this plastic raw material were keeping abreast of this situation until the all-out production of synthetic rubber imposed an abnormal demand on the supply of the country's styrene. Styrene, a chemical necessary for the production of both polystyrene plastics and synthetic rubber, then became short in supply. This shortage increases as the synthetic rubber program expands.

During the past several months molders were using about 23,138,000 pounds of polystyrene, which is now being cut back to 17,000,000 pounds a month. This latter figure compares with an anticipated monthly requirement of 30,000,000 pounds, when all the new molding equipment now being installed is in operation in a few months.

Representatives of the injection molders committee on national security of the SPI are meeting frequently with Rubber Reserve, NPA, and NSRB to keep them informed of the injection molders' predicament, as it now stands, and with conditions in the industry as they change.

ECA Sponsored Visit of West German Technicians

The Economic Cooperation Administration, under the auspices of its technical assistance program, sponsored a visit to the United States of nine rubber industry technicians from West Germany during November. The group, composed of four representatives from the West German tire industry and five from the mechanical goods industry, visited American rubber goods factories and firms manufacturing rubber processing machinery. The trip or trips, since the tire and mechanical goods groups separated at certain times and one group went to tire plants while the other went to mechanical goods plants, was under the direction of W. H. G. FitzGerald, technical assistance division of ECA, with cooperation from the RMA.

The tire group was made up of Erich Bobeth, Phoenix, Hamburg; Alfred Titze, AdK, Frankfurt a.M.; Willi Kraemer, Dunlop, Hanau; and Theo. R. Schmauser, Engelbert, Aachen. The group from the mechanical goods industry was composed of Fritz Paasche, Clouth, Koln; Heinz Vieweg, Metzeler, Munchen; Wilhelm Kunst, Vorwerk u. Soh, Wuppertal; Guenther Schwiersch, PAGUAG, Dusseldorf; and Detlev Schmidt, Frankfurt a.M.

The object of the visit for the tire group was to obtain information on standardization, specialization, and simplification employed by American tire manufacturers, including utilization of synthetic rubber, blending processes, manufacture and use of fabrics, and on all types of rubber processing machinery.

The mechanical rubber goods group planned to study American methods for the manufacture of rubber articles (except tires), with specific interest in obtaining information on standardization, specialization, and simplification of the manufacture of conveyer belts, V-belts, hose, hard rubber articles, and rubber automotive products, including information on American methods of measurement, test, and quality norms.

After a general orientation meeting and discussion of the rubber goods industry in the United States with the RMA staff under the direction of A. L. Viles, president, which also included conference with representatives of India RUBBER WORLD, *Rubber Age*, and *Tires Service Station*, the groups left New York on an extended tour.

Rubber companies visited by both groups included Goodyear, Firestone, General Tire, and U. S. Rubber Reclaiming. The tire group also visited Goodrich, Seiberling, United States Rubber Co., and Armstrong Rubber Co. This group visited the Ford Motor Co. in Detroit, Mich., in connection with tire standards for the automotive industry.

The mechanical goods group visited Goodrich in Akron, O.; General Tire in Wabash, Ind.; Dryden Rubber Division, Sheller Corp.; Van Cleef Bros., Inc.; Republic Rubber Division, Lee Rubber & Tire Corp.; Simplex Wire & Cable Co.; and Boston Woven Hose & Rubber Co.

Both groups went through the plants of the St. Louis Car Co. and the American Car & Foundry Co. in St. Louis, Mo.

Machinery companies visited by both groups were McNeil Machine & Engineering Co., Biggs Boiler Works, Adamson United Co., United Engineering & Foundry Co., National Rubber Machinery Co., and Farrel-Birmingham Co., Inc.

Both groups visited the National Bureau of Standards, Rubber Section; the mechanical goods group spent some time at the American Society for Testing Materials, while the tire group did likewise with The Tire & Rim Association, Inc.

Labor News

Wage increases averaging about 12¢ an hour were granted hourly employes of Firestone, Seiberling, Dunlop Rubber Co., Goodyear Aircraft Corp., Mohawk Rubber, U. S. Rubber, General Tire, and Lee Tire during late October and in November. These wage increases were negotiated between the United Rubber Workers of America, CIO, and the managements of the companies mentioned. Similar wage increases were granted hourly employes of Goodyear Tire and Goodrich earlier in October.

The majority of these new contracts include provisions for using a portion of the 12¢-an-hour increase to correct intraplant inequities. In some cases also a portion of the increase was used to correct interplant inequities. For example, in the Firestone wage settlement, the company and the union agreed to take ½¢ of the 12¢ from the Akron, Los Angeles, Calif., and Pottstown, Pa., employes and give it to workers at other plants of the company. Of the 11½¢ increase for Akron workers, 2½¢ will also be used to adjust certain wage differences existing in this plant. All Akron Firestone production workers will receive at least 9¢-an-hour increase, and some in the lower brackets, more than 9¢.

The Goodyear Aircraft wage increase was a straight 12¢-an-hour raise for all workers with no provision for correcting intraplant inequities.

A wage increase of 9¢ an hour plus an additional amount to correct inequities was also granted workers at Sun Rubber Co.

This fifth round of wage increases in the rubber industry would seem to add up to an average hourly rate of about $1.70 for all workers in the industry at present. The October, 1950, issue of the "Monthly Labor Review" of the U. S. Department of Labor reports for the last recorded month, July, 1950, an average hourly rate for all rubber industry workers of $1.585. The 12¢-an-hour increase would bring this rate to about $1.70 an hour plus or minus a few cents, depending on the plant and the type of work being done. Of course, different branches of the industry, such as tires, footwear, mechanical goods, vary in hourly rates above and below the average figure for all rubber industry workers.

Jefferson Chemical Co., Inc., 711 Fifth Ave., New York 22, N. Y., will begin the manufacture of monoethanolamine, diethanolamine, and triethanolamine next year at its Port Neches, Tex., plant. A contract has been awarded for the erection of a unit to make the ethanolamines, and completion of this unit is scheduled for the latter half of 1951. Ethylene oxide, made by Jefferson at Port Neches, will be used in the manufacture of the ethanolamines. Other products of the company include ethylene glycol, diethylene glycol, ethylene dichloride, and others. The company was formed in 1944 by Texas Co. and American Cyanamid Co. to manufacture chemicals from petroleum raw materials.

EAST

Scrap Rubber Institute Meets

The Scrap Rubber Institute of the National Association of Waste Material Dealers, Inc., held its annual fall meeting on October 6 at the Hotel Traymore, Atlantic City, N. J. Institute President Henry M. Rose, H. Muehlstein & Co., Inc., presided over the meeting, which featured a discussion on "The Effect of Extremely Low Scrap Tire Prices in Causing an Inflated Scrap Market" by George Abrams, U. S. Rubber Reclaiming Co., Inc., representing the reclaimers, and Roger Ottignon, Nat E. Berzen, Inc., representing the scrap dealers.

Mr. Abrams emphasized that there is no such thing as a reclaimer's or scrap dealer's point of view. Although they may differ as to the price of a particular lot of scrap, the welfare of both are closely related. Reclaimers are interested in obtaining a stable scrap price, rather than just a low price, the speaker stated. Such a stable price will enable the reclaimer to calculate his costs and selling prices and thus operate at a profit. A stable, realistic price for scrap rubber which moves in accordance with demand will also permit the regular scrap dealer to operate for longer periods of time at profitable levels.

After describing the make-up of the scrap rubber market, its dealers and consumers, Mr. Ottignon reviewed the history of the postwar market. The speaker stated his belief that the cumulative effect of reclaimers drastically reducing inventories of scrap rubber and permitting the scrap price structure to reach such abnormally low levels resulted in an inflated scrap market as soon as heavy demand arose for replenishing inventories.

The meeting program also included an open forum on "Problems of Enforcing Shipments under Scrap Dealers' Contracts," led by Ben Gordon, A. Schulman, Inc., and Sidney Freedman, of Muehlstein. In addition Mr. Rose reported on the work of the Institute's executive committee, and L. N. Larsen, of Muehlstein and chairman of the group's traffic committee, reported on efforts to extend the recent 15% freight rate reduction into other than official territory.

Goodrich Advances Personnel

Earl Hensal has been named production superintendent of tire manufacture in the Akron plant of The B. F. Goodrich Co., and William L. Carpenter production superintendent of the company's Miami, Okla., plant.

Mokal G. Morgan has also been appointed superintendent of the tire division at the Kitchener, Ont., plant of The B. F. Goodrich Rubber Co. of Canada, Ltd.

Hensal, with the company since 1933, started as a factory employe while attending the University of Akron. After three years in the factory standard department of the tire division in Akron, Hensal was transferred to the Oaks, Pa., plant as manager of the factory standards department, in 1939, and in 1943 was sent to the Los Angeles, Calif., plant as general foreman. Last February he became superintendent of tire production at the Kitchener plant, from which post he returns to Akron.

Carpenter, who joined Goodrich, 15 years ago, has served in many capacities, including those of compounding chemist, development engineer, technical group head, manager, raw materials inspection and development, and assistant to the tire division general manager for the last nine months.

Morgan has been with the company 12 years. His service includes two years at the Los Angeles plant as a compounding chemist, followed by three years in the processing division in the Akron plant as a technical man. Named technical manager at the Miami plant in 1946, he became production superintendent there two years later, remaining until transfer to his Canadian post.

John H. DeHamm has been appointed special representative for the Goodrich shoe manufacturers' sales department at Akron. He will assist in the development of products for shoe manufacturers' use, supervise sales promotion, and undertake current analyses of shoe production by areas, types of shoes and seasonal trends.

Vice President Vaught to Retire

George W. Vaught, financial vice president of the Goodrich company since 1940, will retire on December 31. When he joined the company more than ten years ago, Mr. Vaught planned to retire to his ranch in Texas at the end of five years of active service. At the request of President John L. Collyer and the board of directors the vice president agreed to continue his responsibilities an additional five years ending December 31, 1950.

Born in Texas in 1888, Mr. Vaught was educated at Southwestern University and became a teacher of high school and college mathematics in Texas. He also served as a coach and athletic director during his teaching days. He began his business career with the First National Bank of Port Arthur, Tex., in 1914 and joined Montgomery Ward & Co. in 1917. After extensive experience in accounting and merchandising divisions of that company he was elected treasurer in 1933 and a director in 1936.

Ships Huge Conveyer Belt

One of the largest conveyer belts ever built and shipped in a single roll was recently completed in the new $5,000,000 belt plant of Goodrich at Akron. Representing the first major product of the new plant, the belt weighs 45,000 pounds and is 48 inches wide, and the roll of belting is 15 feet high. Designed for the Baltimore & Ohio Railroad, the belt will bring ore from ship to shore at the railroad's new dock in Baltimore, Md.

Conveyer Belt Built by Goodrich, Said to Be One of the Largest Ever Built and Shipped in a Single Roll

Tire Developments

Following an extensive series of tests on both snow and ice by the Pittsburgh Testing Laboratory, a new Goodrich tire especially designed for winter and mud service on passenger cars was announced by James J. Newman, company vice president. In these tests, the new tire operating on snow stopped a car up to 88 feet sooner on ice and up to 19 feet sooner on snow than did standard highway tires with conventional treads. In tests against other winter service tires, the new casings stopped the car from 17-40 feet sooner, Newman said. The new tire has a radically different type of tread, and its cleats act as lugs to penetrate snow and mud and give a windshield wiper action on ice, packed snow, and wet pavement. The new tire runs quietly on paved highways.

According to Goodrich tire engineers, 12 solid rubber tires used at Langley Aeronautical Laboratory, Langley Field, Va., are within 0.002-inch of being absolutely cylindrical and are as near perfectly round as a tire can be. Used in special tests, the tires were built by Goodrich from old patterns and have integral construction; the tire is vulcanized on the wheel. The tires were made with extra-heavy treads that were then ground down to meet specifications. Passenger-car tires made for these tests were molded to within 0.05-inch of a true circle; while truck tires were within 0.075-inch of being perfectly round.

Flintkote Co., 30 Rockefeller Plaza, New York 20, N. Y., for the third time in the past four years, was awarded the *Financial World's* "Bronze Oscar" for having submitted the best annual report (1949) in the entire building material field. Presentation of the award was made by Weston Smith, executive vice president of the magazine, to G. K. McKenzie, Flintkote vice president and secretary, at the annual awards banquet held recently in New York.

Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J., has appointed John T. M. Frey assistant manager of the New York branch and Lamar S. Hilton assistant sales manager of the abrasive wheel department. Mr. Frey has been a member of Manhattan's New York sales organization for many years. Mr. Hilton formerly served in the capacity of sales engineer.

New York Quartermaster Procurement Agency, 111 E. 16th St., New York 3, N. Y., recently awarded to The Rubber Corp. of California, Garden Grove, Calif., contract for 271,836 pairs of shoepacs at $7.92 a pair; Gro-Cord Rubber Co., Lima, O., for 27,000 pairs of full rubber soles; O'Sullivan Rubber Corp., Winchester, Va., 1,150,000 pairs of rubber composition tap half soles; United States Rubber Co., Naugatuck, Conn., 5,904 pairs of firemen's rubber boots at $7.37 a pair.

Hercules Powder Conference of Editors

The Hercules Powder Co., Wilmington, Del., held a conference of editors at its experiment station early in October, which was attended by 45 technical and trade paper editors serving industries using Hercules chemical materials.

At a dinner at the Hotel du Pont on the evening of October 2, Theodore Marvin, director of advertising, presided and introduced Charles A. Higgins, president of the company, and the general managers of the major company divisions. Mr. Higgins explained the position of Hercules Powder in the chemical industry and some of its research activities. Following this talk, a movie, "Problem-Solution-Result," further described research activities of the company.

At the experiment station on October 3, the editors were briefed by various men from the several departments prior to their tour of the station. M. R. Budd, assistant director of advertising, presided at this session and first introduced J. O. Small, manager, product applications, synthetic department, who discussed the resins and vehicles used in varnish and lacquer production. Special mention was made of the "hot-spray technique" for cellulose lacquers, which was demonstrated during the tour of the station.

P. F. Neumann, manager, technical service, paper makers chemical department, described the use of sizing chemicals in paper making, made mention of recent developments in the production of wet strength papers, and stated that much technical service was required in the paper industry.

A. R. Olsen, manager, plastic promotion, cellulose products department, reminded the editors that other departments of the company also manufactured resins, i.e., naval stores, synthetics, etc. He considered cellulose acetate resin, however, one of the most important resins on the market in view of its use in toys, sports equipment, kitchen utensils, toilet seats, and many other consumer items. A flame-resistant cellulose acetate has been developed for Christmas light fixtures and electrical household equipment. The high shock resistance of ethyl cellulose plastic was also emphasized.

Brief talks by a representative of the sales research group and R. W. Cairns, assistant director of research, concluded the briefing session, and a tour of the station began.

Rosine Amine D, which with certain of its derivatives has a wide range of useful properties for fungicides, bactericides, and as a cationic flotation reagent was first demonstrated.

The use of Hercules Parlon chlorinated rubber and Clorafine chlorinated paraffin as flame retarding ingredients in new fire-resistant plaster was also demonstrated.

Another interesting exhibit was that of Vinsol resin-shellac-type break-resistant phonograph records. This resin is also used in lacquer and varnish formulations and in the emulsion form as a rock wool binder and as an emulsifier in slow-break asphalt emulsions.

Hercules CMC cellulose gum, a water soluble material, has found extensive application as a suspending agent with synthetic detergents for laundry use. Hercules is the first company to manufacture this cellulose gum on a commercial scale and makes two grades, one for use with synthetic detergents, and the other for use in pharmaceuticals and cosmetics.

Hercules supplies chemicals to four major divisions of the rubber industry: manufacturers of synthetic rubber, adhesives, vulcanized rubber, and reclaimed rubber. The Dresinates (alkali salts of rosin and derivatives) are used in GR-S-10; and a Dresinate is now included, along with Hercules produced hydroperoxide, in all production of commercially available "cold rubber." Rosin rubbers have improved building tack and give better wear and crack resistance in tires. Staybelite (hydrogenated rosin) and Staybelite esters have long been used in adhesives. Dresinol (a water dispersed resin) is used in the latex adhesives field. Vinsol resin can be used where a stiff rubber with reduced resilience is desirable.

To the rubber reclaiming industry Hercules supplies terpene hydrocarbons, such as Solvenol, which acts as a penetrating solvent in the reclaiming process.

The relatively new development of "hot-spraying" cellulose lacquer mentioned previously was demonstrated on wood and metal surfaces. In this process, heat is used instead of added volatile lacquer ingredients to make the lacquer thin enough to spray. Basically, there is no difference in the type of finish, or composition of solids, between the two types of lacquer application, hot or cold. Because the solids applied by the hot method are higher, the number of coats required are correspondingly fewer, and hot-spray lacquer users find they spend less for the finish applied, it was said.

Visits to a new large-scale samples laboratory or pilot-plant for organic chemical processes, the high-pressure laboratory, and the explosives area were among the other interesting features of the program.

H. P. Fuller Retires

Pequanoc Rubber Co., Butler, N. J., has announced the retirement of Harold P. Fuller on October 31, 1950. Mr. Fuller is well known and very highly regarded by the entire rubber industry, having been closely associated with the sale of reclaim rubber for more than 46 years.

Mr. Fuller had been vice president of E. H. Clapp Rubber Co. for many years and since 1934 was the New England sales representative for Pequanoc. He has been a prominent member of the Boston Rubber Group for a long time and has held various offices in that Group.

Harold P. Fuller

His many friends will be happy to know that he is retiring in excellent health and plans to continue his association with them at the various rubber group meetings around the Boston area. He will also retain his affiliation with Pequanoc in a consulting capacity.

Open New G-E Laboratory

Ceremonies dedicating the new quarter of the General Electric Co. research laboratories at Schenectady, N. Y., were held October 9. Founded 50 years ago as the nation's first industrial research laboratory, the organization has just observed its golden anniversary. As part of the celebration, the National Academy of Sciences held its autumn meeting at the laboratory.

The new laboratory was formally dedicated by the company president, Charles E. Wilson, who presented a golden key marking the fiftieth anniversary to C. G. Suits, company vice president and director of research. In his address Mr. Wilson said that scientific research is tied more tightly than ever before to the lives and fortunes of the general public, not only because of military developments, but because of the steadily increasing flow of new ideas and products from the nation's laboratories. Industrial research laboratories recognize that their prime goal is supplying new scientific facts which can rapidly be translated into increasing benefits to the entire nation.

In his acknowledgment Dr. Suits paid tribute to Mr. Wilson's continued interest in the research laboratory and unveiled a bronze plaque expressing the appreciation of the laboratory staff to the company president. Mr. Wilson unveiled two heroic glass portraits of Dr. Suits' predecessors as director of the research laboratory, W. R. Whitney and W. D. Coolidge, both of whom were present as honored guests. These portraits, set into the glass wall of the entrance lobby, were made by a new process developed by Corning Glass Works in which the photographic image is formed through the glass itself and not applied merely as a surface coating.

Establishes Washington Office

A new sales office for the G-E chemical department has been opened at Washington, D. C., according to S. L. Brous, marketing manager of the department. The office is in the Shoreham Bldg. at 806 15th St., N.W. With increasing defense activities, the chemical department has established this office in the capitol area to serve governmental requirements efficiently. Products of the department include silicones, laminated and molded plastics, electrical insulation, plastics molding compounds, and resins.

Hoffer Plastics Engineering Manager

Robert A. Hoffer has been named engineering manager for the plastics division of the G-E chemical department at Pittsfield, Mass. Mr. Hoffer was formerly with the E. I. du Pont de Nemours & Co., Inc., where he held positions in production and the industrial relations section. He later did postwar development work, process engineering, and development work on markets for new products. Just prior to joining G-E, he was a technical representative in the Chicago area and sales representative in the Cleveland area.

U. S. Rubber Erecting New Quarters in New Orleans

To provide better distribution service for customers, a new building housing both offices and warehouse is being erected at New Orleans, La., for United States Rubber Co., Rockefeller Center, New York, N. Y. Located at 900 S. Jefferson Davis Parkway and expected to be ready with the New Year, it will be headquarters for the distribution of products for all of Louisiana as well as parts of Alabama, Florida, and Mississippi.

As one of the important stocking points in the company's distributing system, the branch will handle a complete line of tires, mechanical goods such as belting, hose, wire and cable; footwear and clothing, textile products, agricultural chemicals, drug sundries, Koylon mattresses, and numerous other articles manufactured by U. S. Rubber.

The new building is to be one story high and will have a floor space of approximately 70,000 square feet. The offices will be air-conditioned. Part of the office will be heated electrically by means of "Uskon" conductive rubber ceiling panels, a development of U. S. Rubber.

Growth of the company's business in this area, and the continued industrial expansion in the deep South, especially in the gas and oil field, and in the paper industry, necessitated the move to larger quarters, according to E. J. Espenan, operating manager. In recent years, the branch has outgrown the facilities of its present location at 444 Canal St.

The company's branch personnel, including office and warehouse employes as well as sales force, number approximately 110.

Personnel News

Joseph A. Conlon, district sales manager, Chicago branch, has been appointed manager of allied sales for the mechanical goods division. With headquarters at the company's offices in Rockefeller Center, Mr. Conlon will be responsible for sales and merchandising activities of the following affiliates of the mechanical goods division: Eureka fire hose and L. H. Gilmer divisions, New York Belting & Packing Co., and the card clothing sales division.

Edwin D. Meade, manager of western railway sales, was named Mr. Conlon's successor at Chicago.

Mr. Conlon joined U. S. Rubber in June, 1930, as a salesman in its Los Angeles, Calif., branch. He worked his way up through various sales and merchandising positions until 1945, when he was named assistant district sales manager of the mechanical goods division's Chicago branch. In September, 1949, he became district sales manager in Chicago.

Mr. Meade started with the company as a clerk in the New York branch in 1935 and entered mechanical goods sales in New York a year later. In 1941 he became a special representative of the war products division with headquarters in Washington, D. C. Then in 1947 he was transferred to Chicago as manager of Western railway sales.

Vice President Elmer H. White has been elected a director and member of the executive committee of U. S. Rubber. He was formerly general manager of the footwear and general products division and since July 1 has been the company's top-level adviser on sales, sales promotion, advertising, and distribution. Mr. White started with the company as a stockboy 47 years ago.

Vinyl Plastic for Decorating

U. S. Rubber is now producing Naugahyde vinyl plastic wall covering for use in hospitals, hotels, restaurants, clubs, theaters, offices, institutions, and homes. The covering has a special tough backing which gives it stability in hanging, and it can be applied with conventional adhesives on most wall surfaces. The product also has a smooth, fine textured grain and is highly resistant to abrasive wear, scuffing, and gouging. It will not become brittle or chip, retains its color and texture, and can be washed with soap and water, it is claimed. The covering is made in 30-yard rolls 50 inches wide and is being produced in 12 colors. Sole distributer in the New York, New Jersey, and the New England areas is Richard E. Thibaut, Inc.; while other distributers will be announced at a later date.

Elastic upholstery material with a new high slip finish has been developed by U. S. Rubber for use in automobiles, buses, trucks, and furniture. Made of a new type of vinyl plastic named Elastic Naugahyde, the material, it is claimed, will stretch in every direction, is easy to tailor, stays permanently soft and pliable, and combines a special elastic supporting fabric and an elastic plastic coating. Service tested for almost two years, the material has been adopted by leading car manufacturers for upholstering of 1951 model automobiles and is also being used by furniture manufacturers for chairs, sofas, and reclining rockers that have heretofore been difficult to tailor. Elastic Naugahyde is sold in rolls 30-40 yards long and 47 inches wide, with colors on a special order basis.

Wire and Cable for the Subway

A major expansion is under way of the subway wiring system in Brooklyn, N. Y., and U. S. Rubber has received the order for all necessary wire and cable. The installation calls for more than 14,000 feet of 2,000,000-circular mil cable, some of the largest made. The balance of the installation will use assorted sizes ranging downward to 250,000-circular mil types. Neoprene jacketed and lead jacketed cables are being supplied for use on both 600- and 1,000-volt service.

Resurfacing Rubber Avenue

Rubber Avenue, one of the main streets in Naugatuck, Conn., has been resurfaced with a combination of asphalt and meltable rubber compound developed by Naugatuck Chemical Division, U. S. Rubber. Naugatuck is the site of the factory which in 1843 produced the first rubber product under the original patent of Charles Goodyear. Local highway officials expect the rubberized pavement to give at least twice the wear as straight asphalt paving and also to reduce maintenance costs.

Heyden Chemical Corp. will spend approximately $1,175,000 for additions to existing manufacturing facilities at its Garfield, N. J., plant. The principal items in the above total are a new power plant unit and new manufacturing units for the production of pentaerythritol. It is estimated that the installations will be completed during the last quarter of 1951.

Calco Appointments

American Cyanamid Co., Calco Chemical Division, Bound Brook, N. J., has appointed David T. Cornfoot assistant to the manager for the Boston office, and W. E. Small assistant to the manager for the Providence office of the Calco division. Cameron Mackenzie has been named to a new post with the responsibility for coordinating certain activities between the Calco plant at Bound Brook and the Boston and the Providence sales offices.

Mr. Cornfoot, after service during World War I, first entered the dyestuff industry with Jennings Co. and joined Calco Chemical Co., later Calco Chemical Division of American Cyanamid, in 1930.

Mr. Small, until 1941 when he came to Calco, was associated with various textile plants and dyestuff suppliers in New England.

Mr. Mackenzie, after service in World War II, in February, 1946, started with Calco as a student trainee.

Arthur H. Sampson has returned as New England manager, dyestuff department, Calco Chemical. He joined Calco on July 1, 1917, and in 1923 was appointed New England manager in charge of dyestuff sales.

Firestone Notes

Charles C. Dybvig has rejoined the development department of The Firestone Tire & Rubber Co., Akron, O., after a two-year leave of absence. He returns to his former duties in Detroit as resident engineer of the tire division, working with the car and truck manufacturers in the area. Joining Firestone in 1933, Mr. Dybvig held several sales positions in the Philadelphia area and immediately after Pearl Harbor went to the development department, where he spent the early months of World War II in the intensive synthetic rubber development program. Next he was transferred to Detroit as resident engineer, which position he held from 1944-1948.

J. E. Trainer, a director of the Firestone company and its vice president in charge of production, has been named vice president for industry for the National Safety Council, Chicago, Ill.

The Bearfoot Sole Co., Inc., Wadsworth, O., according to President I. B. Calvin in a recent report to shareholders, has completed its 1949-50 expansion program and started a new program for 1950-51. The latter calls for a $200,000 expansion in equipment, some of which is to be delivered in March, and expansions to buildings amounting to about $125,000.

George B. Brands, formerly with the rubber section of the research laboratories of Armstrong Cork Co., Lancaster, Pa., recently joined the R. R. Olin Laboratories, Akron, O., as an associate consultant.

Electric Hose & Rubber Co., Wilmington, Del., has an annual capacity of 150,000,000 feet per year for hose production, and not 1,500,000 feet as was inadvertently reported in our story of the company's fiftieth anniversary on page 219 of our November issue.

Goodyear Developments

A new device has been developed by Goodyear Tire & Rubber Co., Akron, O., to aid in tire service operations by its dealers. Termed the Mate-Rite Balance Aide, the device provides a means for properly mating tires and tubes when mounting so as to obtain better balance. While not a balancing machine, the device operates by gravity to indicate light and heavy spots in tires and tubes which can be marked accordingly. By mating the light spot on the tire with the heavy spot on the tube it is possible greatly to reduce the amount of lead weight formerly required in tire balancing.

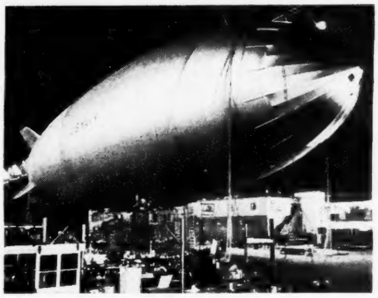
Goodyear is reported to have manufactured the world's first two-mile conveyer belt, now being used to carry coal under a mountain. Consisting of a single loop of rubber with steel reinforcement, the belt travels almost 11,000 feet in a single stretch from the tipple of a West Virginia coal mine to a Monongahela River loading point. The belt weighs 122 tons, travels at a speed of 300 feet a minute, and delivers coal at the rate of 300 tons an hour. The mine is cut off from both rail and river shipping by a mountain barrier two miles wide and 400 feet high. After exploring all means of transporting the coal, the mine management decided that a tunnel through the mountain combined with a conveyer belt would be the safest, fastest, and most economical haulage to the river.

Construction of the ZPN airship, a new N-type non-rigid craft for use in the Navy's anti-submarine warfare program, is well under way in factories of the Goodyear Aircraft Corp. at Akron, where the ship was designed. The airship will incorporate all the latest developments adapted to the locating and destruction of enemy submarines. The total time for design and construction of the craft will approximate two years. The ship's envelope will have a capacity of 875,000 cubic feet of helium gas, and the power plant will consist of two seven-cylinder single-row engines mounted within the car. Each engine can drive two 18-foot propellers mounted on outriggers projecting from the car. Speed in the neighborhood of 75 knots is anticipated, and the ship will have a retractable tricycle-type landing gear. The nose-wheel tire will be an 8.50-10 six-ply rayon cord type; while the main tires will be 29-13.5 six-ply nylon cord types.

Personnel Transferred

W. G. Bernel, manager of production control for Goodyear's Plant C in Akron, has been named manager of the mechanical goods merchandise distribution department in Los Angeles, Calif., replacing K. D. Logan, resigned. Mr. Bernel joined Goodyear in 1925 as a repairman, left in 1927, but returned in 1933 as a dispatcher in production control. During and immediately following the war, Bernel handled assignments in fuel cell control, mechanical goods merchandise, and in the Airfoam division of chemical products. He was appointed manager of production control in Plant C, when it was converted to an Airfoam and Pliofilm plant in 1947.

D. K. Usher has been appointed assistant manager of the Airfoam division and will report to R. E. Pauley, division manager, with offices at Goodyear's special products plant, Plant C. Winner of the Litchfield award as the best domestic salesman in 1948, Usher has been with the company since 1935. He has held company store assignments at Providence, R. I., and Lynn, New Bedford, Quincy, and Boston, Mass., and joined the Airfoam



New ZPN Airship Being Built by Goodyear Aircraft

sales staff as a field representative in the New York offices. Last year he was placed on special assignments at Akron.

Robert G. Luskin, formerly a cement and adhesives compounder for Goodyear at Los Angeles, Calif., has been transferred to the sales staff of the company's chemical division. For the present he will be stationed in Los Angeles. Luskin has been with Goodyear since 1946.

Prize for Financial Report

Vice President P. E. H. Leroy represented Goodyear at the "Oscar-of-Industry" dinner sponsored by *Financial World* at Hotel Statler, New York, N. Y., October 30, where 100 firms in all fields of commercial endeavor received "best of industry" awards for the excellence of their annual reports to stockholders for 1949.

Goodyear's report, in addition to winning first place under the classification of rubber and tires, also was adjudged third best in the overall competition among manufacturers. This was the second straight year that the Goodyear annual report won the "best of industry" award in the rubber industry.

WEST

Armour Research Foundation, Illinois Institute of Technology, Chicago, Ill., through W. E. Mahin, director of research, has announced that a new $10,000 rubber research laboratory has been established. Specific projects now in progress include custom compounding of rubber stocks for specialized uses, and a basic study of new types of petroleum oils and resins as compounding ingredients. A 200-ton hydraulic press, a rubber mill, and other pieces of heavy equipment were donated to the laboratory jointly by the Foundation and the White Cap Co. Various pieces of testing equipment were donated by Precision Scientific Co. Alfred G. Susie, supervisor of rubber and plastics research at the Foundation, stated that its staff of rubber specialists will work with both natural and synthetic rubbers.

F. Warren Bicker, technical director of Diamond Wire & Cable Co., Sycamore, Ill., has been named project leader in the new rubber research laboratory and will direct compounding operations and evaluation work with the various rubbers and elastomers. He will work with Dr. Susie.

Mathew Keck has been elected a vice president of Borg-Warner Corp., Chicago 4, Ill., and also will continue as treasurer. Mr. Keck joined Borg & Beck Co., Moline, Ill., in 1920 as controller, then became secretary-treasurer. He was named secretary-treasurer of Borg-Warner when the corporation was formed in 1928, with Borg & Beck as one of the four original founding companies. He retained that post until last April, when he became treasurer and **Ray W. Dose** was made secretary.

Burgess Pigment Co., 64 Hamilton St., Paterson, N. J., has announed that stocks of its products are being carried by the California Warehouse, 1248 Wholesale St., Los Angeles 21, Calif., and are available through Merit Western Co., Los Angeles. These warehousing facilities are in addition to those Burgess maintains at Trenton, N. J., Akron, O., and Providence, R. I. The company manufactures or distributes both reinforcing and filler-type clays, antioxidants, plasticizers, reclaiming oils, and mineral colors.

Paper-Plastics Conference

(Continued from page 327)

nitrile rubber combinations in the pulp and paper industry.

The October 20 morning session was on "Cellulose—Accessibility, Reactivity, and Properties Relating to Plastics." Four papers were given at this session: "Accessibility of Cellulose," Harold Tarkow, United States Forest Products Laboratory; "Kinetics and Equilibria in Cellulose Reactions," H. M. Spurlin, Hercules Powder Co.; "Accessibility as Determined by Formic Acid Esterification," R. F. Nickerson, Monsanto Chemical Co.; and "Pulp Property Requirements for Dissolving Pulps," R. H. MacClaren, Eastman Kodak.

The luncheon meeting, also held at Drumlins Country Club, was attended by 150 persons. There was no formal program, but brief talks were given by Mr. Wheadon, director of the Institute of Industrial Research, Syracuse University, and H. L. Shirley, assistant dean of the College of Forestry.

The afternoon technical session was devoted to Plastic Coating Fundamentals, with the following talks given: "Alathon Polythene Coatings—Properties and Techniques," Alfred Stockfleth, E. I. du Pont de Nemours & Co., Inc.; "Effect of Compounding Variables on Styrene-Butadiene Latex Used for Protective Coatings for Paper," M. E. Wendt and W. H. Aiken, Goodyear; "Technology of Styrene Latex Paper Coating," E. A. Haddad, Monsanto; and "The Versatile Vinyl Enters the Paper Coating Field," A. L. Hatfield, Goodrich Chemical.

Mr. Stockfleth discussed the use of Alathon polyethylene for paper coating in view of its inert properties and its resistance to moisture vapor transmission. Mr. Wendt reported results of tests on a coating composition consisting of a butadiene-styrene copolymer latex, an emulsified wax, and a thickening agent. Mr. Haddad stated that the formulation of Lustrex styrene latex paper coatings are still in the initial stages of development, with the major problem being the selection and testing of thickening agents and modifiers. Mr. Hatfield described methods of formulating and applying plastisols, solutions, and latices to papers.

NEWS ABOUT PEOPLE

Wm. C. Dearing has joined Koppers Co., Inc., Pittsburgh, Pa., as assistant manager of the research department laboratory section. Dr. Dearing had become associated with the Plaskon division, Libbey-Owens-Ford Glass Co. in 1937 and was made its director of research before leaving two years ago for a similar position with Behr-Manning Corp.

George L. Fenn, secretary and assistant treasurer of Adamson-United Co., Akron, O., has been elected to the company's board of directors. Fenn, with the company for the last 10 years and in his present executive post for six years, is the son of Carl L. Fenn, retired, former treasurer of the firm.

John J. Loge, since 1928 personnel manager at The General Tire & Rubber Co., Akron, O., has been named to head the company's recently organized employes service department. Mr. Loge, who has devoted a major portion of his time to pensions, Social Security provisions, group insurance, workmen's compensation, etc., for several years, will now give his exclusive time to their administration. The 55-year-old Loge began his career at General in September, 1923, as a tire builder's helper.

Harold Killam has been appointed director of technical service at the American Polymer Corp., Peabody, Mass., manufacturer of resin emulsions and dispersions for use in the paper, textile, leather, adhesive, paint, and rubber industries. His duties will involve guidance in industry of the use of polyvinyl acetate, acrylic, styrene, butadiene, and similar latices. Mr. Killam was formerly employed by Dewey & Almy Chemical Co. and Union Paste Co.

E. M. Pflueger and **C. A. Klebsattel**, vice president and technical director, respectively, of Advance Solvents & Chemical Corp., New York, N. Y., have resigned their positions after 20 years with that company and have formed a new firm, Naftone, Inc., with offices at 745 Fifth Ave., New York 22. This new company will deal in chemical products of various manufacturers, specializing in raw materials used by the paint and rubber industries, with which both Mr. Pflueger and Mr. Klebsattel have been associated closely for many years.

Gordon Porterfield has returned to the New York office of The Baldwin Locomotive Works as sales representative for hydraulic presses, power tools, hydraulic turbines, and Pelton products. Mr. Porterfield has spent more than 15 years in the engineering and sales fields and was a member of the Baldwin engineering staff for 11 years.

Jack Walsh, 105 Washington Court, Trenton, N. J., has been appointed sales representative for The Stamford Rubber Supply Co., Stamford, Conn. Mr. Walsh, formerly with American Oil & Supply Co., will cover the New Jersey and Philadelphia area and as far south as Baltimore.

Fabian Studios

W. J. R. Hauser

W. J. R. Hauser, who terminated his association with Heveatex Corp. several months ago, has been appointed manager of the latex products department of Stein, Hall & Co., Inc., 285 Madison Ave., New York, N. Y.

Frank F. Silver has been added to the engineering staff of the Akron, O., plant of The Mohawk Rubber Co. Mr. Silver, formerly with The Goodyear Tire & Rubber Co., spent a year on its training squadron at Jackson, Mich.; served during 1943 and 1944 at Calcutta, India, for the company doing technical work for the Air Force at the Dunlop factory, producing airplane tires; and for the past 3½ years was at Goodyear's South Africa factory, where he was in charge of technical service and tire design.

James Jackson Minot, a partner of Paine, Webber, Jackson & Curtis, Boston, Mass., recently was elected a director of Dewey & Almy Chemical Co., Cambridge, Mass.

George W. Parkin, formerly division manager at the Trenton, N. J., plant of National Automotive Fibres, Inc., has been made assistant sales manager of the automotive division, with headquarters in Detroit, Mich.

George D. Tilley has been appointed sales manager, mechanical rubber goods, Quebec division, Dominion Rubber Co., Ltd. Mr. Tilley whose headquarters will be Montreal, succeeds **A. C. McGiverin**, who in addition to being Quebec division sales manager for mechanical rubber goods, is also director of government sales for all company products and will now confine his activities to this latter capacity. Mr. Tilley joined Dominion's mehanical rubber goods plant in Montreal in 1926 and was connected with the production and the industrial engineering departments prior to his transfer in 1941 to the Quebec division sales department, of which he became assistant sales manager in 1949.

William A. Hamor, assistant director of Mellon Institute, Pittsburgh, Pa., has been named by the Pittsburgh Section of the American Chemical Society to receive its Pittsburgh award for 1950. The award, a bronze plaque granted annually for outstanding service to chemistry, will be presented to Dr. Hamor at a dinner in the University Club of Pittsburgh on December 21.

David Juelss, for the past 15 years chief engineer for the American Lead Pencil Co., Hoboken, N. J., has been appointed technical director of the firm. In his new position he will have the responsibility of the design and development of new products and machinery for the parent company and its subsidiaries.

C. H. Hodgdon has been promoted to a new executive post by The Rubberset Co., Ltd., Gravenhurst, Ont., that of vice president in charge of sales, with headquarters in Gravenhurst. He had been sales manager for the eastern division of the company since 1922, with headquarters in Montreal.

FINANCIAL

Baldwin Locomotive Works, Philadelphia, Pa., and wholly owned subsidiaries. Nine months ended September 30: net profit, $1,977,472, equal to 79¢ a common share, against $2,297,098, or 92¢ a share in the same period of the preceding year; sales, $66,477,226, against $92,852,-937.

Borg-Warner Corp., Chicago, Ill. First nine months, 1950: net earnings, $23,715,-259, equal to $9.95 each on 2,336,748 common shares against $15,132,483 in the '49 period; net sales, $243,713,151, against $212,397,930.

Philip Carey Mfg. Co., Cincinnati, O., and subsidiaries. Nine months to September 30: net profit, $2,747,169, equal to $3.35 a common share, against $1,825,239, or $2.20 a share, a year earlier.

Columbian Carbon Co., New York, N. Y. January 1-September 30, 1950: consolidated net earnings, $4,342,750, equal to $2.69 a share, against $4,621,475, or $2.87 a share in the corresponding period of 1949.

Cooper Tire & Rubber Co., Findlay, O. Nine months to September 30: net profit, $305,964, equal to $1.95 a common share, in comparison with a loss of $183,-283 last year; net sales, $8,878,317, against $4,313,605.

Flintkote Co., New York, N. Y., and subsidiaries. Forty weeks to October 7: net income, $5,753,838, equal to $4.35 each on 1,260,435 common shares, contrasted with $4,303,321, or $3.20 each on 1,257,935 shares, in the '49 weeks; net sales, $61,845-729, against $52,053,137.

Crown Cork & Seal Co., Inc., Baltimore, Md., and wholly owned subsidiaries. Nine months to September 30: net income, $1,581,460, equal to 97¢ a common share, compared with $1,862,802, or $1.20 a share, in the 1949 months.

DeVilbiss Co., Toledo, O., and wholly owned subsidiary. First nine months, 1950: net profit, $649,925, equal to $2.17 each on 300,000 capital shares, compared with $359,200, or $1.20 a share, in the like period last year.

Dewey & Almy Chemical Co., Cambridge, Mass. Nine months ended September 30: net earnings, $1,421,433, equal to $4.44 a common share, contrasted with $556,160, or $1.74 a share, in the 1949 period; net sales, $15,482,804, against $12,-183,853.

General Cable Corp., New York N. Y. First nine months, 1950: net income, $1,-254,081, equal to 36¢ each on 1,917,646 common shares, compared with $1,277,681, or 37¢ a share, in the 1949 months.

General Motors Corp., Detroit, Mich. Nine months ending September 30: net profit $702,655,156, equal to $7.89 a common share, against $502,414,029, or $5.60 a share, in the corresponding period last year; net sales $5,598,769,322, against $4,-458,079,585.

Byron Jackson Co., Los Angeles, Calif. Nine months ended September 30: net profit, $834,495, equal to $2.21 a share, against $1,136,839, or $3 a share, a year earlier.

Johnson & Johnson, New Brunswick, N. J., and domestic subsidiaries. First three quarters, 1950: net income, $10,231,-853, equal to $5 a share, against $7,180,-830, or $3.69 a share, in the 1949 quarters.

Koppers Co., Inc., Pittsburgh, Pa. First three quarters, 1950: net income, $7,-970,722, equal to $4.65 each on 1,617,125 common shares, contrasted with $5,356,242, or $3.03 a share in the same period of 1949; net sales, $153,795,766, against $148,-912,973.

Monroe Auto Equipment Co., Monroe, Mich. Third quarter, 1950: net income, $146,077, equal to 33¢ a common share, against $139,553, or 31¢ a share, in the corresponding quarter of 1949.

National Lead Co., New York, N. Y. Nine months to September 30: net earnings, $18,902,074, equal to $5.14 a common share, contrasted with $10,779,881, or $2.82 a share, in the 1949 period; sales, $236,-760,077, against $198,313,025.

New Jersey Zinc Co., New York, N. Y. Third quarter, 1950: net profit, $3,-372,997, equal to $1.72 a share, against $408,506, or 21¢ a share, in the corresponding quarter of 1949.

Okonite Co., Passaic, N. J. First nine months, 1950: net profit, $693,987, equal to $5.06 a share.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Armstrong Rubber Co.	A & B	$0.25 extra	Dec. 26	Dec. 15
	A & B	0.25	Dec. 26	Dec. 15
	Pfd.	0.59⅜ q.	Jan. 1	Dec. 15
Bearfoot Sole Co., Inc.	....	6.00	Nov. 23	Nov. 10
Boston Woven Hose & Rubber Co.	Pfd.	3.00 s.	Dec. 15	Dec. 1
Brown Rubber Co., Inc.	Com.	0.25	Dec. 1	Nov. 18
Brunswick-Balke-Collender Co.	Com.	1.50 yr. end.	Dec. 15	Dec. 1
Canada Wire & Cable Co., Ltd.	"B"	0.75	Dec. 15	Nov. 30
	"A"	1.00 q.	Dec. 15	Nov. 30
Collyer Insulated Wire Co., Inc	Com.	0.20	Nov. 1	Oct. 20
Crown Cork & Seal Co., Inc.	Com.	0.25	Nov. 29	Nov. 8
	Com. Pfd.	0.50 q.	Dec. 15	Nov. 21
Dayton Rubber Co.	A Pfd.	0.50 q.	Dec. 16	Dec. 1
	Com.	0.30	Dec. 16	Dec. 1
DeVilbiss Co.	Com.	0.12½	Dec. 20	Dec. 8
Dewey & Almy Chemical Co.	Com.	0.50 q. incr.	Dec. 20	Dec. 8
Electric Hose & Rubber Co.	50% stock	....	Oct. 20	Oct. 10
Endicott-Johnson Corp.	Com.	0.40 q.	Jan. 1	Dec. 20
	4% Pfd.	1.00 q.	Jan. 1	Dec. 20
Firestone Tire & Rubber Co.	Com.	1.00 extra	Dec. 1	Nov. 15
	Pfd.	1.12½ q.	Dec. 1	Nov. 15
Flintkote Co.	Com	1.00 yr. end	Dec. 11	Nov. 25
	Com.*	0.50 q	Dec. 11	Nov. 25
	Pfd.	1.00 q.	Dec. 15	Dec. 1
General Motors Corp.	$3.75 Pfd.	0.93¾ q.	Feb. 1	Jan. 8
	$5 Pfd.	1.25 q.	Feb. 1	Jan. 8
General Tire & Rubber Co.	Com.	0.25 q.	Nov. 30	Nov. 20
	Com.	0.50 extra	Nov. 30	Nov. 20
	Com.	1.00 spec. extra	Nov. 30	Nov. 20
Goodrich, B. F. Co.	Com.	2.50 yr. end	Dec. 30	Dec. 8
	Com.	1.00	Dec. 30	Dec. 8
	Pfd.	1.25 q.	Dec. 30	Dec. 8
Goodyear Tire & Rubber Co.	Com.	1.00 extra	Dec. 20	Nov. 20
Gro-Cord Rubber Co.	Com.	0.20 irreg.	Oct. 31	Oct. 25
Hewitt-Robins, Inc.	Com.	0.40 incr. q.	Dec. 15	Nov. 30
	Com.	1.00 extra	Dec. 15	Nov. 30
Johns-Manville Corp.	Com.	0.75 incr.	Dec. 8	Nov. 27
	Com.	1.05 yr. end	Dec. 8	Nov. 27
Kleinert, I. B., Rubber Co.	Com.	0.25 spec.	Dec. 12	Nov. 28
	Com.	0.25	Dec. 12	Nov. 28
Lea Fabrics, Inc.	Com.	0.37½	Nov. 30	Nov. 10
Midwest Rubber Reclaiming Co.	Com.	0.25 q.	Jan. 1	Dec. 4
	Pfd.	0.56¼ q.	Jan. 1	Dec. 4
Minnesota Mining & Mfg. Co.	Com.	1.00 yr. end	Dec. 12	Nov. 22
	Pfd.	1.00 q.	Dec. 12	Nov. 22
Mohawk Rubber Co.	Com.	0.25 extra	Dec. 30	Dec. 11
	Com.	0.25 q.	Dec. 30	Dec. 11
National Automotive Fibres, Inc	Com.	0.50 irreg.	Dec. 1	Nov. 10
Plymouth Rubber Co., Inc.	Com.	0.25 res.	Nov. 28	Nov. 10
Raybestos-Manhattan, Inc	Com.	1.50 incr.	Jan. 2	Dec. 11
Rome Cable Corp.	Com.	0.10 extra	Dec. 26	Dec. 5
	Com.	0.20 q.	Dec. 26	Dec. 5
	Pfd.	0.30 q.	Jan. 2	Dec. 5
Russell Mfg. Co.	Com.	0.37½	Dec. 15	Nov. 30
Seiberling Rubber Co.	A	6.25 accum.	Dec. 20	Dec. 5
	A	1.25 q.	Jan. 1	Dec. 5
	4½% Pfd.	1.12 q.	Jan. 1	Dec. 5
Spalding, A. G., & Bros., Inc	Com.	0.50 extra	Dec. 15	Dec. 8
	Com.	0.25 q.	Dec. 15	Dec. 8
Thermoid Co.	Com.	0.10 extra	Dec. 28	Dec. 15
	Com.	0.15 q.	Dec. 28	Dec. 15
Tyer Rubber Co.	Com.	1.00 s.	Nov. 15	Nov. 1
	Pfd.	1.06¼ q.	Nov. 15	Nov. 1
Union Asbestos & Rubber Co.	Com.	0.25 q.	Jan. 2	Dec. 8
United Elastic Corp.	Com.	0.60 init.	Dec. 8	Nov. 22
United States Rubber Co.	Com.	1.75 extra	Dec. 9	Nov. 20
	Com.	0.75 q.	Dec. 9	Nov. 20
	Pfd.	2.00 q.	Dec. 9	Nov. 20
Viceroy Mfg. Co., Ltd.	Com.	0.20 q.	Dec. 15	Dec. 19
	Com.	0.20 extra	Dec. 15	Dec. 19
Westinghouse Air Brake Co.	Com.	0.50 yr. end	Dec. 15	Nov. 15

O'Sullivan Rubber Corp., Winchester, Va. First three quarters, 1950: net profit, $136,250, equal to 28¢ a common share, compared with a loss of $29,274 a year earlier; net sales, $4,142,093, against $2,-798,570.

Raybestos-Manhattan, Inc., Passaic, N. J., and domestic subsidiaries. First nine months, 1950: net profit, $2,598,386, equal to $4.14 a share, against $1,162,556, or $1.85 a share, in the 1949 months.

Taylor Instrument Cos., Rochester, N. Y. Year ended July 31, 1950: net income, $115,936, equal to 64¢ a share, compared with $420,480, or $2.33 a share in the preceding fiscal year; net sales $11,-264,251, against $12,570,948.

Thermoid Co., Trenton, N. J., and subsidiaries. January 1-September 30, 1950: net profit, $1,068,062, equal to $1.29 a common share, contrasted with $481,412, or 50¢ a share, in the 1949 months.

Minnesota Mining & Mfg. Co., St. Paul, Minn. Nine months to September 30: earnings, $16,590,590, equal to $8.39 a common share, compared with $9,642,407, or $4.89 a share, in the corresponding period of 1949: sales, $110,185,932, against $83,200,660.

Union Asbestos & Rubber Co., Chicago, Ill. Nine months ended September 30: net profit, $232,124, equal to 49¢ each on 475,376 capital shares, contrasted with $616,643, or $1.24 each on 494,376 shares, in the same period of the previous year; net sales, $5,991,833, against $7,178,695.

S. S. White Dental Mfg. Co., Philadelphia, Pa., and subsidiaries. Nine months to September 30: net profit, $536,-818, equal to $1.53 each on 349,899 capital shares, contrasted with $535,283, or $1.79 each on 298,918 shares, in the corresponding period a year ago; net sales, $15,211,-837, against $14,601,743.

(Continued on page 350)

Patents and Trade Marks

APPLICATION

United States

2,498,652. **Shatterproof and Scar-Resistant Laminar Structure Including a Base Sheet Composed of a Major Proportion of Modified Styrene Resin and a Minor Proportion of Synthetic Rubber to Which Is Bonded a Layer Composed of a Major Proportion of Synthetic Rubber and a Minor Proportion of Modified Styrene Resin.** L. E. Daly, Mishawaka, Ind., assignor to United States Rubber Co., New York, N. Y.

2,498,653. **Laminar Structure Including a Base Sheet of a Mixture of a Minor Proportion of Natural Rubber and a Major Proportion of Cyclized Rubber Resin to Which Is Bonded a Layer Composed of a Mixture of a Major Proportion of Natural Rubber and a Minor Proportion of Cyclized Rubber Resin.** L. E. Daly, Mishawaka, Ind., assignor to United States Rubber Co., New York, N. Y.

2,498,785. **Glass Fiber Reinforced Sponge Rubber Article.** E. Bennett and G. H. McFadden, both of Columbus, and J. F. Lyman, Westerville, assignors to Ohio State University Research Foundation, Columbus, both in O.

2,498,859. **Pneumatic Tire Including Bead-to-Bead Cord Plies and a Short Ply in Which the Cords Have Greater Stretchability Than the Cords in the Other Plies.** E. T. Lessig, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,499,012. **Explodable Connector Including a Ring of Tough Plastic Resinous Material and Exploders Embedded in the Ring.** J. P. Welsh, Buffalo, and J. L. Jewett, Cheektowaga, both in N. Y., assignor to the United States of America, as represented by the Secretary of the Air Force.

2,499,087. **Pivot Connection for a Railway Vehicle Having a Cushioning of Resilient Rubber Blocks.** P. M. Bourdon, Paris, France, assignor to Manufacture de Caoutchouc Michelin (Puiseux, Boulanger & Cie.), Clermont-Ferrand, France.

2,499,162. **In a Washing Machine, a Flexible Air- and Watertight Container.** H. J. Rand, Westport, Conn., assignor to H. J. Rand Washing Machine Corp., Cleveland, O.

2,499,477. **Textile Article Made of Yarn of Vinyl Halide/Acrylonitrile Copolymer.** T. A. Feild, Jr., Charleston, W. Va., assignor, by mesne assignments, to Union Carbide & Carbon Corp., a corporation of N. Y.

2,499,643. **In a Polishing Wheel, a Stretchable Elastic Band Disposed within the Abrasive Sleeve Forming the Peripheral Surface of the Wheel, and Means to Expand This Band to Produce a Frictional Bond between Band and Sleeve.** S. Hays, deceased, late of Hamilton County, O., by D. Hays, administratrix, Hamilton County, O.

2,499,751. **Bedroom Slipper with Rubber and Leather Sole.** J. Hoza, Belcamp, Md.

2,499,825. **In an Electric Joint, a Socket Including a Longitudinal Sleeve of Elastic Material.** J. Havlicek, Prague, Czechoslovakia.

2,499,952. **Pump Plunger Ring Including an Annular Body of Thermosetting Synthetic Resin.** D. T. Harbison, Fort Worth, Tex.

2,499,965. **Latex Foam or the Like Sponge Rubber Pillow.** W. A. Miller, assignor to International Latex Corp., both of Dover, Del.

2,500,079. **In a Hobble for Controlling the Gait of a Horse, Plastic Leg Rings and Adjusting Straps.** T. E. Jackson, assignor, by mesne assignments, of one-half to Glyde-Rite Corp., both of Zanesville, O.

2,500,084. **Elastic Inserts in a Garment Lining.** M. Metzger, New Rochelle, N. Y.

2,500,116. **In a Device for Holding an Annular Cake of Fiber for Rewinding, an Elongated Inflatable Member Secured to the Base Member of the Device and Adapted for Insertion in the Core of the Cake.** W. Carter and W. T. Clarke, both of New Bedford, Mass.

2,500,158. **Self-Sealing Fuel Container Having a Sealing Layer of a Textile Fabric Coated with Mixed Cellulose Ester.** W. A. Dickie and G. Rudorf, both of London, England, assignors, by mesne assignments, to Celanese Corp. of America, a corporation of Del.

2,500,253. **Elastically Supported Oscillating Toy.** V. R. Kimple, Wooster, O.

2,500,302. **Rubber Shoe Heel.** F. Vicente, Habana, Cuba.

2,500,306. **Fountain Brush and Attachment therefor.** S. Brodsky, Croton, N. Y.

2,500,342. **Tire for a Wheel Including a Strip of Flexible Material Having a Tread Provided with Spaced Outer Ribs with a Groove therebetween and Means for Securing the Tire to a Wheel Felloe.** R. B. Calcutt and H. Stetner, both of Chicago, Ill.

2,500,467. **Annular Cushion of Rubber Embracing Centering Pins in a Washing Machine of the Spin Dry Type.** J. Pearce, East Longmeadow, Mass., assignor to Savage Arms Corp., Utica, N. Y.

2,500,591. **In an Arch Support Holder for a Backless Shoe, Extension Pads of Rubber-Like Material Having a Checkered Face.** C. T. Watkins and J. J. Naftel, both of Baltimore, Md.

2,500,661. **Lifesaving Device Including a Pair of Bathing Trunks Provided with an Inflatable Bag and Inflating Tube.** J. Chillemi, Yonkers, N. Y.

2,500,668. **Shoe with Binding Having Elastic and Inelastic Sections.** M. E. Duckoff, Manchester, N. H.

2,500,770. **In a Method of Making Water-Soluble Materials Water Repellent, the Application of a Thin Coating of a Vaporizable Organo-Silicon Halide.** J. A. Pierce, Baton Rouge, La., assignor to Standard Oil Development Co., a corporation of Del.

2,500,786. **Vacuum-Type Baby Bottle Container Including Elastic Outer and Inner Shells Provided with Internal Ribs Which Help to Form a Dead-Air Space between the Shells.** J. O. Austin, Bluefield, Va.

2,500,861. **In a Rotary Barrel for Tumbling Articles during Electrochemical Treatment of Articles in Bulk, a Flexible, Self-Sustaining Foraminated Bag of Electrical Insulating Plastic Material for Holding the Articles.** W. M. Phillips, Jr., assignor to Udylite Corp., both of Detroit, Mich.

2,500,937. **Fleece-Lined Boot with a Crepe Rubber Welt and an Outsole of Crepe Rubber.** P. D. Earl, Malone, N. Y., assignor, by mesne assignments, to Cambridge Rubber Co., a corporation of Md.

2,501,103. **Artificial Minnow Having a Main Body Portion of Sponge Rubber.** E. R. Slater, Oil City, Pa.

2,501,372. **Wire Fabric Tire Casing.** A. E. Benson, Detroit, Mich., assignor to United States Rubber Co., New York, N. Y.

2,501,457. **In a Fire Detector Cable, Including an Inner Bare Conductor, a Core of Resinous Material for the Conductor.** G. W. Thelin, Wellesley, assignor to Fenwal, Inc., Ashland, both in Mass.

2,501,484. **Soil Pipe Runner Including a Split Ring of Resilient Compressible Material for Encircling a Soil Pipe.** L. H. Thomas, Canoga Park, Calif.

2,501,493. **Vehicle Tire and Tread therefor.** C. L. Beward, assignor to General Tire & Rubber Co., Akron, O.

2,501,540. **Thermal Insulating Member for Refrigerators Including a Built-up Structure of Laminated Plastic Material.** P. P. Ryan, Trenton, N. J., assignor to St. Regis Paper Co., New York, N. Y.

2,501,828. **Pneumatic Tire Tread.** M. C. Overman, assignor of two-thirds to H. C. Smyth, Jr., both of New York, N. Y.

2,501,830. **For Telephone Receivers, a Molded Rubber-Like Receiver Cap over Which Is Slipped a Soft Rubber Annulus with Raised Outer Rim and Central Aperture.** W. Ruml, Jr., East Orange, N. J.

2,501,839. **Stubble Surfaced Material Including a Layer of Milled Rubber Having Raised Bosses on One Side and over It a Layer of Stubble Surfacing Formed from Sponge Rubber.** V. H. Bodle, Alhambra, Calif., and G. W. Blair and L. P. Dosmann, assignors to Mishawaka Rubber & Woolen Mfg. Co., all of Mishawaka, Ind.

2,501,944. **Sealing Means of Synthetic Rubber for Mixers, Etc.** G. Jaeger and C. L. Bohmer, assignors to Jaeger Machine Co., all of Columbus, O.

2,502,182. **Device for Giving Ice Massages Including a Rubber Bag Having One End Open for Reception of the Ice and One Side Foraminated to Permit Ice Water to Escape; the Other Side Has Strap Loops for a Hand.** E. M. Strauch, Denver, Colo.

2,502,205. **Stack Curing Apparatus Including an Inflatable Unit Integrally Formed with a Main Conduit.** E. V. Collins and V. S. Peterson, both of Ames, Iowa.

2,502,237. **Heel Guard for Shoes.** W. D. Smith, Lakeland, Fla.

2,502,313. **Vibration Absorbing Support.** H. M. Dodge, Wabash, Ind., assignor to General Tire & Rubber Co., Akron, O.

2,502,322. **Shock Absorbing Device.** R. Iredell, Jr., Wabash, Ind., assignor to General Tire & Rubber Co., Akron, O.

2,502,362. **Teat Cup Assembly for Use in a Milker Including a Rigid Shell and a Flexible Inflation Having Its Body in the Shell.** H. B. Babson, Chicago, and C. A. Thomas, Crystal Lake, both in Ill., assignor to Babson Bros. Co., a corporation of Ill.

2,502,406. **Composite Article Including Vulcanized Rubber in Which Are Embedded Cords of Regenerated Cellulose Having a Resinous Condensation Product of a Phenol and Sulfur Distributed throughout Each Filament.** D. Entwistle, Coventry, assignor to Courtaulds, Ltd., London, both in England.

TRADE MARKS

United States

520,234. **Gripsem Arch.** Footwear. French, Shriner & Urner Mfg. Co., Boston, Mass.

520,236. **Santoseal.** Cements. Monsanto Chemical Co., St. Louis, Mo.

520,237. **Tippo.** Dolls. Ideal Novelty & Toy Co., Hollis, N. Y.

520,238. **Lino-weld.** Adhesive. Paraffine Cos., Inc., San Francisco, Calif.

520,240. **"Betty Burp."** Dolls. Ideal Novelty & Toy Co., Hollis, N. Y.

520,242. **Pabcohesive.** Adhesive. Paraffine Cos., Inc., San Francisco, Calif.

520,250. **Bulldog.** Tire chains, etc. Hodell Chain Co., Cleveland, O.

520,251. **Monsanto.** Cements. Monsanto Chemical Co., St. Louis, Mo.

520,275. **Icemaster.** Tire chains. M. Marthinson, Michigan City, Ind.

520,282. **Style-Craft.** Footwear. G. R. Kinney Co., Inc., New York, N. Y.

520,283. **Duo.** Adhesive. Johnson & Johnson, New Brunswick, N. J.

520,401. **Staylastic.** Elastic braids and webs. Continental Elastic Corp., New Bedford, Mass.

520,521. **Dri-Lined.** Bathing caps. I. B. Kleinert Rubber Co., New York, N. Y.

520,552. Representation of a jagged-lined rectangle containing the words: **"Super Three Fast Charger,"** and an oval containing the representation of a coat of arms and the words: **"The General Battery."** Storage battery chargers. General Tire & Rubber Co., Akron, O.

520,563. **Frisco.** Tire and tube repair patches. Fritzsche Tire & Reliner Co., Chicago, Ill.

520,565. Representation of a circle containing the words: **"Armstrong Cork Company,"** and inner circle containing the letter: **"A."** Gaskets, washers, rings, and packings. Armstrong Cork Co., Lancaster, Pa.

520,609. **Victor.** Gaskets and parts thereof. Victor Mfg. & Gasket Co., Chicago, Ill.

520,617. **X-Tron.** Synthetic resins. Monsanto Chemical Co., St. Louis, Mo.

520,669. **Kapco.** Rubber asphalt joint sealing compound, roof cement, etc. American-Marietta Co., Chicago, Ill.

520,693. **Rucoam.** Vinyl plastic. Rubber Corp. of America, New York, N. Y.

520,710. Representation of a label containing the word: **"Philkob."** Mechanical rubber goods. Triangle Rubber Co., Inc., New York.

520,748. **Reliance.** Stair treads, and mats. Cussins & Fearn Co., Columbus, O.

520,757. Representation of two parallel lines between which are the representation of a ring containing a bulldog, and the words: **"Bull Dog Gold Edge Boston U.S.A."** Belting. Boston Woven Hose & Rubber Co., Cambridge, Mass.

520,760. **White House.** Mats and stair treads. Cussins & Fearn Co., Columbus, O.

520,762. **White House.** Garden hose. Cussins & Fearn Co., Columbus, O.

520,826. **Loxite.** Adhesive cement. Firestone Tire & Rubber Co., Akron, O.

520,836. Representation of an arrow forming a circle and containing the words: **"Western Auto."** Tires. Western Auto Supply Co., also doing business as Western Auto Stores, Kansas City, Mo.

520,838. **Golden Key.** Polishing wax for rubber floors etc. Great American Tea Co., New York, N. Y.

520,862. **Grantline.** Bicycle tires and tubes. W. T. Grant Co., New York, N. Y.

520,887. **Griplink.** Transmission belting. Browning Mfg. Co., Maysville, Ky.

520,891. **Seiberling.** Tires, auto flaps, reliners, strap-on boots, blowout patches, valve patches, camelback, repair kits, and inner tubes. Seiberling Rubber Co., Akron, O.

520,893. **Tri-Ply.** Wicks. Raybestos-Manhattan, Inc., Passaic, N. J.

520,908. **Paracril.** Synthetic rubber. Esso Standard Oil Co., Wilmington, Del.

520,910. **Klintab.** Prophylactic sheath. Klingfast Rubber Co., Akron, O.

520,943. **Full-Seal.** Flush tank balls. Scully Rubber Mfg. Co., Baltimore, Md.

521,021. Representation of a diamond containing the words: **"Vertex Déposé."** Elastic fabrics. Etablissements Budios, Romilly-sur-Seine, France.

521,050. **Skivertex.** Plastic-coated rubber-impregnated fabric. Philip G. Whitman, Inc., New York, N. Y.

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Best Wishes for a Happy and Prosperous 1951
H. MUEHLSTEIN & CO. INC.
60 EAST 42nd STREET, NEW YORK 17, N. Y.
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521,051. **Weartone.** Shower curtains. Wear-ever Shower Curtain Corp., Brooklyn, N. Y.

521,089. **Electromatic.** Tire tube patch and valve stem vulcanizing kits. J. W. Speaker Corp., Milwaukee, Wis.

521,107. Representation of a lined circle. Footwear. Mishawaka Rubber & Woolen Mfg. Co., Mishawaka, Ind.

521,169. **Melflex.** Mats and matting and stair treads. Melflex Products Co., Inc., Akron, O.

521,198. **Cambridge.** Raincoats, etc. I. J. Rubin, New York, N. Y.

521,210. **Grafton.** Rain topcoats. Rain-fair, Inc., Racine, Wis.

521,214. **Ainsco.** Footwear. Goodyear Rubber Co., Middletown, Conn.

521,227. **Fairprene.** Synthetic rubber composition sheeting. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

521,228. Representation of a lady and a man in a horse-drawn carriage. Footwear. Andrew Geller Shoe Mfg. Co., Inc., Brooklyn, N. Y.

521,239. Representation of a flower and a fanciful circle containing the words: **"Foot Flairs."** Footwear. Mutual Shoe Co., Marlboro, Mass.

521,258. **Our Hero.** Soles. Plymouth Rubber Co., Inc., Canton, Mass.

521,327. Representation of a tire and the words: **"Skid Rid."** Anti-skid tire tread material. Andy Bros. Tire Shop, Washington, Pa.

521,328. Representation of a label containing the word: **"Bestbilt."** Heels and soles. F. Cleve, Jr., Kansas City, Mo.

521,343. **Brother 'n Sis-.** Footwear. Ed White Junior Shoe Co., Paragould, Ark.

521,347. **Speed-Cord.** Transmission belts. Gates Rubber Co., Denver, Colo.

521,348. **"The Symbol of Safety".** Prophylactic articles. Youngs Rubber Corp., New York, N. Y.

521,410. Representation of an oval containing the word: **"Inland."** Pressure blocks, molds, vulcanizers, etc. for tire repairing. Inland Rubber Corp., Chicago, Ill.

521,451. **Dor-Tite.** Adhesively coated sponge rubber strip. Durkee-Atwood Co., Minneapolis, Minn.

521,491. **Leathoklene.** Leather substitute. A. Weitzman, New York, N. Y.

521,505. **Anthony.** Tire valves. Anthony Co., Long Island, N. Y.

521,554. Representation of a budding enclosed in an airwrap and containing the word: **"Airwrap."** Plant propagation sheeting. W. R. Grove, Laurel, Fla.

521,576. **Carnival.** Balloons. National Hygienic Products Corp., Akron, O.

521,586. **Fairprene.** Adhesive synthetic elastomer compound cements used also as protective coatings and for other purposes. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

521,603. **Lustrex.** Synthetic resins. Monsanto Chemical Co., St. Louis, Mo.

521,609. **Alumitel.** Electrical conducting wire. Nichols Wire & Aluminum Co., Davenport, Iowa.

521,652. **Yards-more.** Golf balls, tees, etc. Harry C. Lee & Co., Inc., New York, N. Y.

521,678. Representation of an oval containing the words: **"Lady Cannon."** Footwear. Cannon Shoe Co., Baltimore, Md.

521,679. **Can-flex.** Footwear. Cannon Shoe Co., Baltimore, Md.

521,686. **Rain Wraps.** Waterproof shoe coverings. Benton Thompson Co., Inc., Naugatuck, Conn.

521,688. Representation of a heel containing the words: **"In-R-Spring Heel."** Heels. H. H. Smith, Bay Shore, N. Y.

521,695. **hollywood teen-er.** Foundation garments, garter belts, etc. California Foundations, Inc., Los Angeles, Calif.

521,743. **Sno-Pak.** Cut flower resin foam bases. United States Rubber Co., New York, N. Y.

521,759. **Clear Weave.** Bathing caps, etc. Clear Weave Hosiery Stores, Inc., Jamaica Plain, Mass.

521,776. Representation of a circle containing two dotted-line circles and another circle containing the words: **"Quality Renown Shoe."** United States Rubber Co., New York, N. Y.

521,820. **"Cambricoid."** Electrical cords, wires, and cables. American Electric Cable Co., Holyoke, Mass.

521,821. **"Lusterized."** Electrical battery cables, cords, and wire. American Cable Co., Holyoke, Mass.

521,828. **Air-Pad.** Rubber floor coverings. Voorhees Rubber Mfg. Co., Inc., New York, N. Y.

521,831. Representation of a badge containing the representation of a rooster. Insulating tape. Paraffine Cos., Inc., San Francisco, Calif.

521,833. Representation of an arrow containing the word: **"Hood."** Rubber battery parts, etc. B. F. Goodrich Co., New York, N. Y.

521,884. **Playtex.** Inflatable mattresses. International Latex Corp., Dover, Del.

521,912. **Silvercool.** Raincoats. Silvertex Co., Philadelphia, Pa.

521,954. Representation of a segment of a circle containing a circle. Footwear. Mishawaka Rubber & Woolen Mfg. Co., Mishawaka, Ind.

521,969. **Scotch-Weld.** Electrical insulating sheet material. Minnesota Mining & Mfg. Co., St. Paul, Minn.

522,040. **Carroll Hall.** Raincoats. Plymouth Wholesale Dry Goods Corp., New York, N. Y.

522,216. Representation of a rose containing the word: **"Rosart."** Rubberized baby sheeting. A. I. Epton & Sons, Chicago, Ill.

522,226. **Russialoid.** Pyroxylin coated fabrics. Pantasote Co., Passaic, N. J.

522,237. **Serpentine.** Liquid storing containers. United States Rubber Co., New York, N. Y.

522,263. **Elrene.** Baby panties, bibs, rain capes, and scarves. Elrene Mfg. Co., New York, N. Y.

522,382. **Arrazin.** Floor covering. B. F. Goodrich Co., New York, N. Y.

522,427. Representation of a label containing the words: **"Authorized Hawkinson Tire Tread Service."** Tire retreading services. Paul E. Hawkinson Co., Minneapolis, Minn.

522,452. **Stoutfitters.** Raincoats, suspenders, etc. Marbay Products, Inc., New York, N. Y.

522,453. **Perfecta.** Combs. New York Merchandise Co., Inc., New York, N. Y.

522,488. Representation of an oval containing the word: **"Gates."** Sheeting. Gates Rubber Co., Denver, Colo.

522,503. **Velvomat.** Carpeting. United States Rubber Co., New York, N. Y.

522,556. **Parlon.** Chlorinated rubber. Hercules Powder Co., Wilmington, Del.

522,627. **Dill.** Tire gages. Dill Mfg. Co., Cleveland, O.

522,645. **Giftape.** Tape. Industrial Tape Corp., New Brunswick, N. J.

522,690. **Alon.** Alumina pigment used as reinforcing substance, thickening agent, etc. Godfrey L. Cabot, Inc., Boston, Mass.

522,706. **Santoseal.** Resinous plastic materials. Monsanto Chemical Co., St. Louis, Mo.

522,740. **Imperialyte.** Plastic film. Imperial Chemical & Plastics Corp., Cranston, R. I.

522,878. **Soac.** Rubber compounding material. Chemico, Inc., Cuyahoga Falls, O.

522,914. **Crescent Hyvolt.** Electrical insulating tape. Crescent Insulated Wire & Cable Co., Trenton, N. J.

523,011. Representation of an arm and the word: **"Arm."** Tire inflater. A. R. Moffett, doing business as Arm Mfg. Co., Oakland, Calif.

523,026. **Paraduct.** Insulated wires, cables, and insulating materials. Essex Wire Corp., Detroit, Mich.

523,049. **"Shaf-Tite."** Industrial machinery rubber rolls. Rodney Hunt Machine Co., Orange, Mass.

523,056. Representation of a roll and the word: **"Ideal."** Yieldable surfaced rollers. Ideal Roller & Mfg. Co., Chicago, Ill.

523,068. **BasKidBall.** Toy basketballs. W. N. Tieche, doing business as Lee Sporting Goods, Milwaukee, Wis.

523,150. **Armstrong.** Storage batteries. Armstrong Rubber Co., West Haven, Conn.

523,201. **Nylenamel.** Insulated wire. Belden Mfg. Co., Chicago, Ill.

523,227. **Fleet-Wing.** Tire repair. Fleet-Wing Corp., Cleveland, O.

Foreign Trade Opportunities

The firms and individuals listed below have recently expressed their interests in buying in the United States or in United States representations. Additional information concerning each import or export opportunity, including a World Trade Directory Report, is available to qualified United States firms and may be obtained upon inquiry from the Commercial Intelligence Unit of the United States Department of Commerce, Washington, D. C., or through its field offices, for $1 each. Interested United States companies should correspond directly with the concerns listed concerning any projected business arrangements.

Export Opportunities

C. S. Grainger, Sir Frank Beaurepaire, and V. G. H. Harrison, representing Olympic Tyre & Rubber Co., Ltd., 68 Cross St., and Olympic Cables, Ltd., Mephan St., both of W. Footscray, Victoria, and Olympic General Products Pty. Ltd., Melbourne, both in Australia: materials for producing tires, rubber goods, and electric and telephone cables.

Edoardo Daelli, representing Massimiliano Massa, Via Senato 20, Milan, Italy: rubber products, plastics.

Eximport, S. R. L., 14 de Mayo, 220, Asuncion, Paraguay: drug and industrial rubber products.

Cia. Internacional de Importación y Exportación, S. A. "Cominsa," Ibañez de Bilbao 2, Bilbao, Vizcaya, Spain: fishermen's rubber boots, mackintoshes.

Hans Eckmann, representing Mar-Lyn Formcraft N. V., 1 Tesselschadestraat, Alkmaar, Netherlands: cotton, rayon, rubber thread, machinery.

Hana Shoe Co., Ltd. (Schoenhandel Hana N. V.), Djalan Batu, Djakarta, Java, Indonesia: textiles and chemicals for manufacturing rubber shoes.

Automobile Parts Trading Co., Ltd., 11 Tameiko-cho, Akasaka Minato-ku, Tokyo, Japan: automobile parts and accessories, batteries, tires and tubes.

J. & H. Schelbach, 39 Rue du Pont, Amay, Liege, Belgium: hospital supplies including surgical rubber goods and druggists' sundries.

P. E. Limbaret, Bolte Postale 280, Leopoldville, Belgian Congo: machinery for fabricating molded and extruded plastics.

Gabrielle de Meeus, 153 Chaussée de Dinant, Wepion/Meuse, Belgium: small toys and plastic articles.

Empresas Cubanas, S. A., Edificio Radiocentro, 917-18, Vedado, Habana, Cuba: automotive products.

K. Sakai & Co., Ltd., Hosono Bldg., 4-chome, Nishinagahori, Hishi-ku, Osaka, Japan: vinyl resin scrap and synthetic rubber scrap.

Hallac & Topalian, P. O. Box 608, Aleppo, Syria: pure white latex finger stalls and surgeon's gloves.

Ange Ladopoulos, 14/16 Souk el Tewfikieh St., Cairo, Egypt: automotive accessories and spare parts.

Establissements John Van Eyck, 83 Rue du Péage, Antwerp, Belgium: plastic upholstery fabrics.

Dr. Giovanni Moggio, 5 Via Giacomo Bove, Turin, Italy: plastic materials, chemical products for the rubber industry.

Cesar R. Douek, 8a Calle Oriente No. 1-b, Guatemala, Guatemala: rainwear.

Togawa Gomu Seizo-Sho, 29 Kohama Nishinocho, 3-chome, Sumiyoshi-ku, Japan: raw materials for making synthetic rubber.

Centeno & Neves, Lda., Rua da Prata, 206 r/c; 208 1° & 2°, Lisbon, Portugal: industrial chemicals, sundry rubber goods, arabic and other gums.

Soccomit, 8 Via Pietro Micca, Turin, Italy: sanitary rubber articles.

Calroy & Co., Ltd., Apartado Postal No. 582, Guatemala, Guatemala: sporting goods.

Alpha Shoe Shop, Helfrichstraat #4, St. Nicolaas, Aruba, Netherlands West Indies: rubber heels.

Douglas H. Munro, 85 Keyworth Ave., Ottawa, Ont., Canada: rubber toys.

Etablissements E. Lecomte & L. Lahaye, 29 Grand' Place, Steenvoorde (Nord), France: footwear.

Celso Reyes h., Tegucigalpa, Honduras: office supplies, raincoats, notions.

Marumatsu & Co., Ltd., 36, 1-chome, Kitakyutaro-machi, Higashi-ku, Osaka, Japan: carbon black, plastic supplies, dyestuffs.

Euro-Orient, P. O. Box 316, Aleppo, Syria: automobile tires and tubes.

Hrant Krikor Melikian, representing Armel's Transport, Ltd., James Watt Rd., Benin City, Nigeria, British West Africa: motor accessories, tires, tubes.

Michel M. Eid, Ave. des Français, Beirut, Lebanon: automobile tires.

Carel van Meel, 96a Schiekade, Rotterdam, Netherlands: all materials connected with the plastics industry.

"R. H. I. W. A.," Rotterdamsche Handle in Wagenbouwartikelen, 6-16 Bergstraat, Rotterdam, Netherlands: materials and accessories used in building car bodies, including rubber for silencing channels, etc.

S. A. Marbel, 26 Rue Wayez, Brussels, Belgium: plastic and rubber toys.

Leon & Lucien Molon, 37-51 Rue Montmirail, Le Havre, Sein-Inferieure, France: rubber boots.

U Hla Maung & Co., 47 Mogul St., (P.O. Box No. 1237), Rangoon, Burma: rubber goods.

Htat Hline Chin Syndicate, 174 Sule Pagoda Rd., Rangoon, Burma: automobile tires, rubber goods, plastic powder.

Felipe Munoz Rodes, Ayestaran 425, Habana, Cuba: V-belts, friction tape. Mitchell Enterprises, 106 Adelaide St. W., Toronto, Ont., Canada: rubber products.

Import Opportunities

"Marbel," 26 Rue Wayez, Brussels, Belgium: beach balls.

Kasho Co., Ltd., No. 3, 2-chome Nihonbashi-Yedobashi, Chuo-Ku, Tokyo, Japan: rubber goods including toys.

Zeus Productions, 62 Dale St., Liverpool 2, England: plastic reference books for engineers.

Boro Rubber Co. (1912), Ltd., Para Rubber Works, Smithy Bridge, Littleborough, Lancashire, England: rubberized materials.

Sterling Rubber Co., Ltd., Midland Works, Tipping St., Manchester 12, England: rubber and plastic raincoats.

Oka Sporting Co., Ltd., 35 2-chome, Nishinakacho, Minami-ku, Yokohama, Japan: sporting goods.

Shichiyo Trading Co., Ltd., Yonei Bldg., 2-chome, Ginza, Chuo-Ku, Tokyo, Japan: rubber goods.

R. W. Bowers & Co., Ltd., Burland Chambers, 6 Major St., Manchester, Lancs., England: rubber machinery.


JOB
PROVED

Yu Cheong Co., No. 16 Kanda Mikuracho Chiyoda-Ku, Tokyo, Japan: rubber goods.

M. Issac Bros., Govind Ram St., Sialkot City, Pakistan: sporting and athletic goods.

Peterson Pipe Co., Sialkot City, Pakistan: sporting goods.

Koch & Wagner, Strasse 147, Nr. 77, Berlin-Kladow, Germany: plastic molding presses.

Asahi Toy Co., Ltd., No. 22, 3-chome, Kuramae, Asakusa, Daito-ku, Tokyo, Japan: rubber toys.

Chulind Lamsam, representing Thai Niyom Panich Co., Ltd., 100 Mahachai Rd., Bangkok, Thailand: rubber.

P. F. Reinshagen, Maschinenfabrik, Bredde 4-8, (22a) Wuppertal-Barmen, Germany: rubber covering machines.

Dunn Trading Co., Ltd., Room No. 622-B, Dojima Bldg., 50, Kinugasa Cho, Kita-Ku, Osaka, Japan: bicycle tire and tubes, rubber shoes and boots, cables, wires.

Herman Berstorff, Maschinenbau-Anstalt G.m.-b.H., Gross Buchholzer Strasse 49, Hannover, Germany: machinery for the rubber and plastics industries.

Chuo Usui Trading Co., Ltd., 9 Kanda-Kamakura-Cho, Chiyoda-ku, Tokyo, Japan: rubber toys and bicycle tires and tubes.

H. E. Hussein Ilhamy Pasha, representing Société Nationale de Matières Plastiques, 2 Maarouf St., Cairo, Egypt: plastic products.

Kyowa Menka Co., Ltd., (Kyowa Cotton Co., Ltd.), No. 28-29, Tosobori-Dori, 1-Chome, Nishi-ku, Osaka, Japan: rubber footwear.

L. Stechler, Ltd., 5 Eastfield Rd., Peterborough, Northants., England: rubber waste of all types.

Hara Trading Co., Ltd., Nippon Bldg., No. 4, Tori 2-chome, Nihonbashi, Chuo-ku, Tokyo, Japan: rubber and canvas shoes, auto and cycle tires and tubes, fountain pens.

Jayme Benchimol & Cia., Travessa Padre Eutiquio, 13/21, Belem, Para, Brazil: true and Massaranduba balata.

Far East Mill Supplies Co., Ltd., Ginza Church, No. 1, Ginza-Nishi 4-chome, Chuo-Ku, Tokyo, Japan: rubber goods.

Société Anonyme des Ateliers Pingris & Mollet-Fontaine Réunis, 4 Rue Virginie Ghesquiere, Lille (Nord), France: installations for the manufacture of vinyl chlorides, plastics, synthetic rubber, etc.

Gerrit Carel Pon, representing N. V. Ponnoplastic, Nijverheidsstraat, Amersfoort, Netherlands: raw plastics materials and molds.

The Orient Commerce Co., P. O. Box Nishi No. 25, Osaka, Japan: tennis shoes.

J. Allen Rubber Co., Ltd., Corinth House, Bath Rd., Cheltenham, Glos., England: rubber goods such as nipples and soothers for infants, rubber gloves, beach and nursery balls, inflatable toy animals.

Caton, Ltd., 70 St. Thomas St., London, S.E. 1, England: rubber products for stationery, hardware, and aeromodel trades.

Nichimen Jitsugyo Kabushiki Kaisha, 36 Sakaemachi, Otaru, Hokkaido, Japan: rubber rainshoes and boots.

AB. Fabriken Orion, Lindesberg, Sweden: hand-operated tire pumps and parts for automobiles and motorcycles, football, basketball, and other ball pumps.

Dr. Manfred Meyer, 16 Heathland Rd., London, N.16, England: rubber goods such as sports requisites, flooring, and dog toys.

Overseas Engineering Co., Ltd., 200 Bishopsgate, London, E.C.2, England: automobile accessory, a miniature automatic pump with puncture attachment, which connects to the fan belt and hub, pumps up and maintains air pressure in a punctured tire as the car is driven along. The firm further states that as long as the engine is running, this accessory can be used not only for inflating tires, but for spraying, pumping up air cushions, dinghies, and tents.

Mitchell & Sons, Ltd., P. O. Box 125, Yokohama, Japan: rubber goods.

Orient Trading Co., Ltd., Izumo Bldg., 8-chome, Ginza, Tokyo, Japan: rubber goods.

Nippu Trading Co., Ltd., 29 Matsunaga-cho, Daito-ku, Tokyo, Japan: rubber goods.

Toho & Co., Inc., Toho Industrial Bldg., 2 Yotsuya San-chome, Shinjuku, Tokyo, Japan: rubber goods.

Nikko Co., Ltd., No. 10, 2-chome, Nihonbashi-Koamicho, Chuo-ku, Tokyo, Japan: rubber goods.

Kawai Trading Co., Ltd., 147, 2-chome, Hinodecho, Nakaku, Yokohama, Japan: cable and wire, electric goods.

T. Okubo & Co., Ltd., 2, Nichome, Takaracho, Chuo-ko, Tokyo, Japan: rubber toys.

Nitto Co., Ltd., 5 Kanda-Iwamoto-Cho, Chiyoda-ku, Tokyo, Japan: rubber goods.

The Tokyo Chamber of Commerce & Industry, Marunouchi, Tokyo, Japan: rubber goods.

Erion, Skindergade 29, Copenhagen K, Denmark: make-up bags of plastic lined with rubberized cloth.

Asano Ishikawa & Co., (1 Bankan) 1 Kaigandori, Ikuta-Ku, Kobe, Japan: rubber goods.

West of Scotland Weatherproofs, Kenmure Works, Bishopbriggs, Glasgow, Scotland: showerproof and rubberized clothing.

James Lee & Sons (Hipperholme) Ltd., Hipperholme Tannery, Halifax, Yorks., England: condenser rubbers and tapes.

Shinwa Co., Ltd., Kinsan Bldg., 4, Muromachi, Tokyo, Japan: raincoats.

Research and Longer Lived Mechanicals

W. L. SMITH, technical superintendent, industrial products division, The B. F. Goodrich Co., in a recent statement, emphasized that research and development during the last ten years has lengthened the service life of industrial rubber products made with both natural and synthetic rubbers so that these products are made to higher specifications and wear longer than those which were manufactured a decade ago.

Ten years ago large coal mining companies expected conveyer belts to carry 25,000,000 tons of coal on certain installations. On such jobs today, belts have a potential of 40,000,000 tons carried. Belts being produced now for conveying hot materials carry 40% greater tonnage within the belt life than belts in the same category carried only ten years ago. Conservative estimates indicate a 100% improvement in the service life of oil-resisting conveyer belts during the past decade.

It was pointed out that one patented feature, resulting in the grommet multi-V-belt, has improved V-belt life by 40%. Today's automotive fan belts are 130% longer lived than the product which was manufactured in 1940.

Longer belt life has resulted from new, stronger fabrics, cord and fibers used to make the strengthening carcass of belts, and the introduction of steel cable cord reinforcement. These developments permit longer belts and higher lift, in the case of conveyer belts.

Ten years ago 2,000-foot centers were about the maximum length. Today belts three or four miles long are possible as the result of higher strength carcasses capable of flexing over conventional pulleys. Ten years ago 300 feet was considered a high lift; now lifts up to approximately 1,000 feet are known, and this height is not the limit of the future, it was said.

The use of synthetic rubber compounds designed for particular jobs in hose tubes and covers, combined with new, improved carbon blacks, has increased hose life in some cases by 500% in a ten-year period. Such improvements are recorded for many types of oil hose owing to improved resistance of the hose tube to oil. Cover improvements include resistance to abrasion and cutting, sunlight, heat, weathering, oil, and acids.

The advent of synthetic textile fibers has resulted in hose with greater strength and lighter weight and the weight of oil suction and discharge hose has been reduced 50% in the past decade. A synthetic filling yarn in one fire hose yields jackets 12% lighter with 50% greater strength. One hose for small air tools is 50% lighter than other hose of the same working pressure.

Smith urged that plant superintendents and foremen in plants using industrial rubber products be doubly certain that these products receive proper care and maintenance so that years of service may be added to those already added to them by recent developments.

Financial

(*Continued from page* 345)

Phillips Petroleum Co., Bartlesville, Okla., and subsidiaries. First nine months, 1950: net profit, $35,885,522, equal to $5.92 each on 6,055,121 shares, compared with $32,684,666, or $5.40 each on 6,047,240 shares in the 1949 months.

Pittsburgh Plate Glass Co., Pittsburgh, Pa., and subsidiaries. Nine months ended September 30: net income, $32,287,806, equal to $3.58 each on 9,030,182 common shares, compared with $25,851,691, or $2.86 a share, in like period last year; net sales, $245,449,903, against $213,114,583.

St. Joseph Lead Co., New York, N. Y., and domestic subsidiaries. First three quarters, 1950: net income, $7,757,769, equal to $3.93 each on 1,975,456 capital shares, compared with $7,085,640, or $3.59 a share, in the corresponding period of 1949; net sales, $72,398,505, against $65,-660,275.

United Carbon Co., Charleston, W. Va., and subsidiaries. First nine months, 1950: net income, $2,496,503, equal to $3.14 a share, against $1,071,727, or $2.48 a share, in the 1949 months.

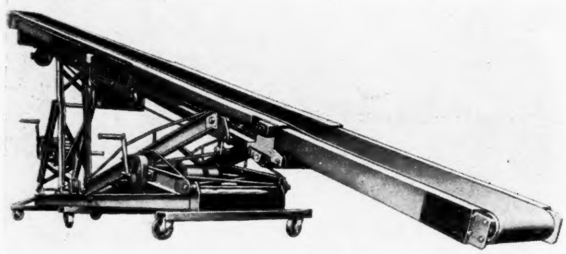
United States Rubber Co., New York, N. Y. Nine months ended September 30: net earnings, $15,857,158 equal to $6.79 a common share, contrasted with $8,619,-600, or $2.68 a share, a year earlier; net sales, $487,136,916, against $396,551,121.

New Incorporations

Inland Rubber International Corp., 120 Broadway, New York, N. Y. 200 shares, no par value. Incorporator: I. Tabman, 120 Broadway, New York. To manufacture adhesive tape, beltings, etc.

Oakdale Rubber & Manufacturing Corp., 280 Madison Ave., New York, N. Y. 200 shares, no par value. Incorporator: D. Hogan, 280 Madison Ave., New York. To manufacture rubber products, etc.

New Machines and Appliances



Stewart-Glapat Adjustoveyor

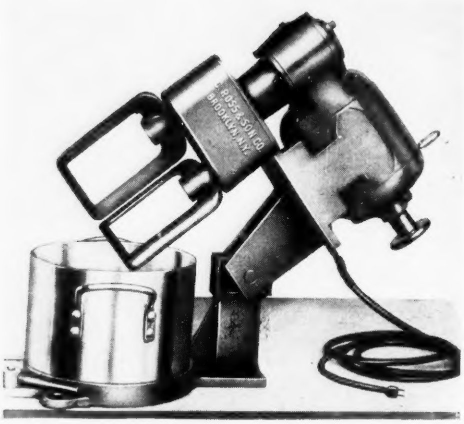
Adjustable Conveyer

THE Adjustoveyor, a new adjustable conveyer which can be used in 10 different positions, all suited to different applications, has been announced by Stewart Glapat Corp., Zanesville, O. The unit is actually two conveyers in one, a standard-length unit and an extreme-length unit. Complete mobility makes it easy to shift the Adjustoveyor to any location inside or outside a plant. All types of packages are easily handled by the unit, together with any type of material that can be placed on a moving belt, it is claimed. The conveyer is suitable for both high and low operations, elevating between floors, and stacking objects in piles.

With its extending feature, the Adjustoveyor can be extended to the full length of a trailer body and then withdrawn, if necessary. By means of its withdrawing boom, the conveyer can go over aisleways and yet permit the passage of other equipment. The unit is available in all standard bolt widths and can be equipped with side rails when desired. The slide-type Adjustoveyor will carry a total distributed load of 850 pounds and a net unit load of 150 pounds before belt slippage; while the roller type will carry proportionately heavier loads. The units are made in a complete range of lengths, permitting standard units to fit into many varying positions.

New Change Can Mixer

A NEW #130-EL motor-driven laboratory change can mixer for mixing batches of one quart to 1½ gallons in volume has been developed by Charles Ross & Sons Co., Brooklyn, N. Y.



Ross #130-EL Laboratory Change Can Mixer

Available in one- or two-gallon capacity sizes, the new unit is said to mix efficiently most varieties and consistencies of materials and will facilitate determination of formulae and other details prior to setting up of production mixing operations.

The mixer can be operated on standard electric current, has a variable speed motor which permits a wide range of stirrer speeds, and has provision for reversing the direction of rotation of the stirrers. The double-motion stirrers revolve on their own axis and simultaneously around the circumference of the can, thus assuring a homogeneous mix in a minimum of time. The cans, of pressed seamless sheet steel, are heavily tin coated. Stirrers and cans are also available in stainless steel or other metals, if desired.

Rubber Industry Growing in South Africa

Demand for tires in South Africa is reportedly keen at present, and factories have for some time past been operating to full capacity. There are now four tire manufacturers here, and the quality of the product has improved so that it is claimed that locally made tires are the equal of any in the world.

As a result of higher prices for various raw materials including such non-sterling items as carbon black, rayon, and cotton, South Africans will have to pay more for tires and also for several other rubber goods. The Tire Manufacturers' Conference of South Africa has fixed the following increases in price levels; 5% on all tubes; 5% on automobile tires; 6% on tractor tires; 10% on tires for trucks and buses; 15% on motorcycle tires. Prices of garden and radiator hoses have gone up 15%.

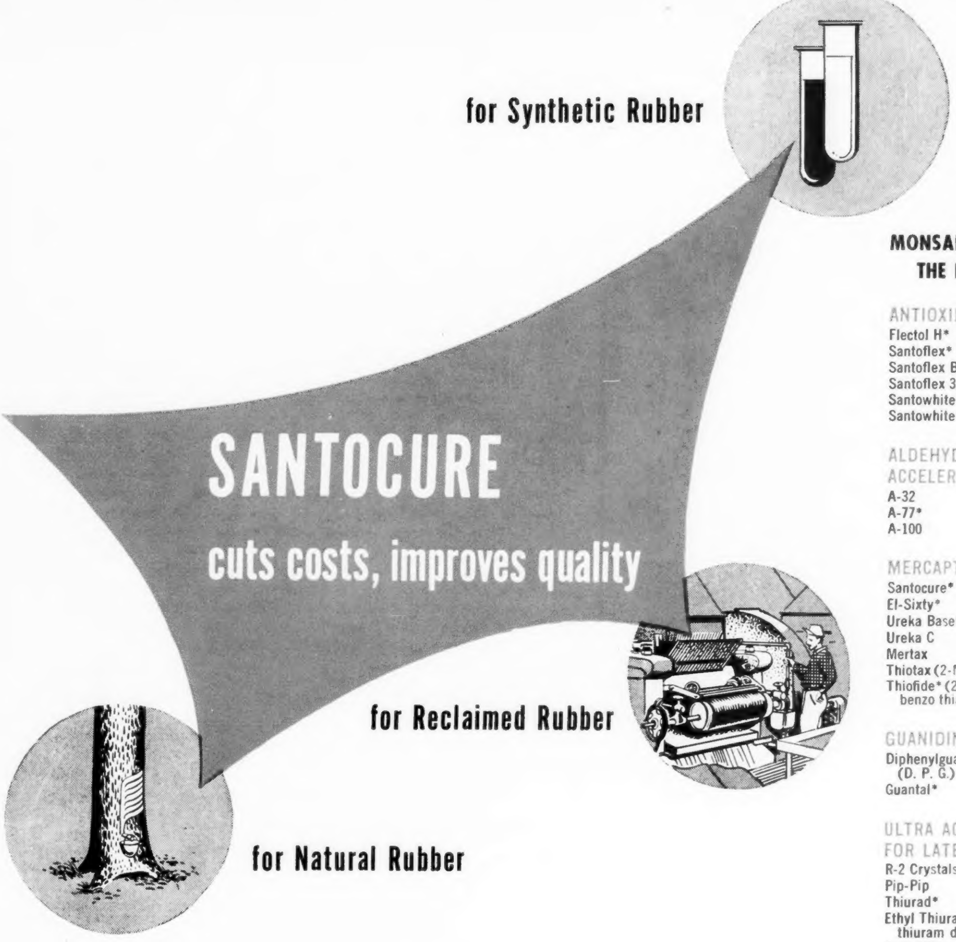
Annual reports of three out of the four local tire factories have become available. The Goodyear Tire & Rubber Co. (S.A.), Ltd., reports net profit of £63,816 for the year ended December 31, 1949, as compared with £112,169 in 1948. The preference dividend absorbed £37,417. The total amount carried forward is now £226,639. According to the report, the company has developed an exceptionally large export market which could be substantially increased if necessary exchange allocations for raw materials became available. Additional plant was installed during the year to meet the needs of the transport, mining, and secondary industries of the Union and the Rhodesias for industrial rubber products.

Dunlop S.A. Ltd., increased its profit in 1949 to £465,059 as compared with £405,925 in 1948. The company acquired a subsidiary, British & Union Rubber Mfg. Co., Ltd., Benoni, in April, 1949. The company's accounts showed stocks decreased from £1,706,412 to £1,190,267; capital was raised from £1,200,000 to £1,750,000.

The General Tire & Rubber Co. (S.A.) Ltd., began to manufacture tires and tubes at its factory in Port Elizabeth in May, 1949, and earned a net profit of £16,373 to December 31, 1949. The preference dividend to the end of 1949 was paid. The chairman stated that it had been possible to secure necessary additional capital without an issue of new shares.

Gradually the range of rubber goods manufactured here is being expanded. Thus Festive Products Mfg. Co., Johannesburg, now makes colored, soft rubber dolls and animals in sizes up to eight inches high. The toys are provided with squeakers, and

(*Continued on page 372*)



MONSANTO CHEMICALS FOR THE RUBBER INDUSTRY

ANTIOXIDANTS
Flectol H*
Santoflex* B
Santoflex BX
Santoflex 35
Santowhite* Crystals
Santowhite MK

ALDEHYDE AMINE ACCELERATORS
A-32
A-77*
A-100

MERCAPTO ACCELERATORS
Santocure*
El-Sixty*
Ureka Base*
Ureka C
Mertax
Thiotax (2-Mercapto benzo thiazole)
Thiofide* (2,2' dithio-bis benzo thiazole)

GUANIDINE ACCELERATORS
Diphenylguanidine (D. P. G.)
Guantal*

ULTRA ACCELERATORS FOR LATEX, ETC.
R-2 Crystals
Pip-Pip
Thiurad*
Ethyl Thiurad (Tetra ethyl thiuram disulfide)
Mono Thiurad (Tetra methyl thiuram mono sulfide)
Methasan* (Zinc salt of dimethyl dithiocarbamic acid)
Ethasan* (Zinc salt of diethyl dithiocarbamic acid)
Butasan* (Zinc salt of dibutyl dithiocarbamic acid)

WETTING AGENTS AND DETERGENTS
Areskap* 50
Aresklene* 375
Santomerse* S
Santomerse D

MISCELLANEOUS MATERIALS
Thiocarbanilide ("A-1")
Santovar* A
Santovar O
Insoluble Sulfur "60"
Retarder ASA

COLORS REODORANTS

*Reg. U. S. Pat. Off.

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Heat Build-up in Rubbers

Interesting new facts about heat build-up in rubbers have been revealed in the course of a study on internal friction, especially in improved rubber, conducted by P. Martinon at the Institut Français du Caoutchouc.[1] The improved rubber was obtained by coagulation of fermented latex; this rubber is harder than ordinary rubber (often above 105° Mooney, as compared with 80 to 85° of usual smoked sheets) and vulcanizes much more rapidly than the latter. Comparative tests have shown that the improved rubber is in general superior to ordinary rubber in resilience and heat build-up, largely owing to the presence in the former of natural accelerators resulting from the manner in which this type of rubber is prepared. When products similar to these natural accelerators—as hexamethylenediamine or ethylenediamine—were incorporated in compounds of ordinary rubbers containing mercaptobenzothiazole, the dynamic properties of these rubbers could be markedly improved so that they resembled those of rubber made from fermented latex. It was also found that in pure gum mixes the heat build-up is inversely, and the rebound elasticity, directly proportional to the degree of reticulation of the vulcanizate; that is to say, a relation exists between the molecular structure and the dynamic properties of rubber. It is suggested that the improved rubber might be particularly suitable for non-loaded mixes, for instance, for making tire carcasses.

[1] *Rev. gén. caoutchouc*, 27, 8, 469 (1950).

Belated Honor for Fresneau

More than a year ago mention was made in these columns of the decision of the Paris Municipality to honor the French engineer Francois Fresneau, now recognized here as the Father of Rubber, by naming an avenue in the Bois de Vincennes after him. The decision was carried out on October 9, 1949, in the presence of a large group including officials, various members of the Institut Français du Caoutchouc, and engineers among whom were delegates from Belgium, Egypt, Great Britain, Indonesia, Italy, Netherlands, Portugal, and Spain, who had arrived in Paris for the International Congress of Engineers for the Development of Overseas Territories, and took the occasion also to honor Fresneau. Late in July, 1950, the I.F.C. issued an illustrated, commemorative booklet, "Hommage de la Ville de Paris a Francois Fresneau."

It reveals that the proposal to name a street in Paris after the long neglected French discoverer of rubber was first made in 1942 during the occupation by the but recently formed I.F.C., which had already baptized its new lecture room the Salle Francois Fresneau. However the time was not opportune, and nothing could be achieved. But once the war was over, the Institut again approached the Parisian authorities and was finally successful.

The booklet reproduces the speeches made at the naming ceremony by M. De Beaupre, representing the Institut; the Count de Chasseloup Laubat, a direct descendant of Fresneau and member of the Upper Council of the Institut; and by M. Grousseaud, representing the City of Paris.

The first and the last speakers restricted themselves to expressions of appreciation, leaving it to the Count to discuss his ancestor's work in greater detail. The Count retold the story of how Fresneau, a Royal Engineer, left for Guiana in 1732—when he was barely 30 years old—to rebuild the fort of Cayenne; how the minister Maurepas, Secretary of the Navy at the time under Louis XV, suggested that the young man take the opportunity to search for plants that might be of use in natural history, with an eye also to their possible introduction into the Royal Gardens; how Fresneau, intrigued by the crude rubber objects made by the Indians, determined to look for the fabulous rubber tree and finally after 14 years of negotiation and research found the tree later to become known as the *Hevea brasiliensis;* how he tapped it on the very day of discovery and promptly covered a pair of specially prepared boots and an old cloak with the tree sap, and sent his report on his discoveries and observations to his friend de La Condamine, who read the report before the Academy and somehow reaped all the glory.

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After Fresneau returned to France, his health destroyed, he continued ceaselessly to work on rubber until his death in 1770. He had tested all kinds of substances—salts, acids, alkalis, etc.—on bits of rubber he had brought back with him in an effort to find a solvent, and he made careful note of his work and his findings. Some time before his death he suggested spirits of turpentine as a solvent.

For some two-hundred odd years Fresneau, overshadowed by the glittering personality of de La Condamine, was neglected; but now at last he is beginning to take his real place among the workers for civilization.

Dunlop Expanding Operations

S. A. des Pneumatiques Dunlop has taken steps to increase production of two of its specialties, Semtex and Dunlopillo. Available facilities did not permit expansion of Dunlopillo output; consequently the company recently acquired a factory at Mantes, where Dunlopillo and dipped Dunlop boots will be manufactured.

A separate company to manufacture Semtex (known as Cemetex in France) was formed last year in which Pneumatiques Dunlop and the Dunlop Rubber Co., Ltd., each have a half interest. The company is to be incorporated shortly. Presently Semtex flooring as well as tiles, marketed under the name "Carrelex," are made at the special factory at Saint-Maur-les-Fosses.

French Dunlop is also erecting a branch at Grenoble and is fitting up a store in Paris. Property has also been acquired at Penestin, to serve as a rest and vacation center for employes.

GREAT BRITAIN

Polymer Chemistry as Applied to Plastics

A symposium, "Polymer Chemistry as Applied to Plastics," organized by the Plastics & Polymer Group of the Society of Chemical Industry, was held in London, September 21-23. The following subjects and chairmen for the various sessions were announced. September 21, p.m.: "The Tools of Polymer Research" (Professor Melville, chairman); September 22, a.m.: "The Relations between Structure and Properties of Polymers" (J. C. Swallow); September 22, p.m.: "Polymerization and Polycondensation—Theory" (R. F. Hunter); September 23, a.m.: "Polymerization and Polycondensation—in Practice" (J. J. P. Staudinger).

Very many chemists and technologists from Europe and the United States attended, and 25 papers were presented, dealing with the tools of polymer research, polymer structure and preparation, theory and practice of polymer formation.

Pickles, Sealy Clarke Retire

Samuel S. Pickles, well-known rubber scientist, has resigned as chief chemist to George Spencer Moulton & Co., Ltd., Bradford-on-Avon, Wilts., a position he held for 38 years. For the time being Dr. Pickles will, however, continue to serve the company in a consulting capacity. He is succeeded by L. G. Shelton, his assistant for the last four years. Dr. Pickles had for several years been on the staff of the Imperial Institute, London, when in 1912 he joined George Spencer Moulton. His activities on behalf of the rubber industry in the succeeding years are well known and in 1939 were recognized by the award of the Colwyn Gold Medal.

James Sealy Clarke, now in his eighty-seventh year, has retired from George Spencer Moulton & Co., Ltd., with which he had been associated in an executive capacity since 1907. Col. Sealy Clarke has for many years been prominent in the rubber industry. In 1919, together with Alexander Johnson, he founded the Research Association of British Rubber Manufacturers; he served as a member of the Council of the Institution of the Rubber Industry since its inception; was a member of the Committee of the India Rubber Manufacturers Association and later helped to form its successor, the Federation of British Rubber Manufacturers' Associations.

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British Firms Expanding

Imperial Chemical Industries, Ltd., has embarked on a huge expansion scheme to cost £80,000,000. Of this amount £22,000,000 have been earmarked for the Wilton works, £17,000,000 for increasing alkali capacity, and £12,000,000 for manufacturing dyestuffs, to mention the more important developments planned. To finance these undertakings more money is required, and the firm is raising another £20,000,000.

The cost of the Catarole plant for producing chemicals from oil, which Petrochemicals Ltd., is erecting at Partington, near Manchester, has exceeded the revised estimates of July, 1948, when it was calculated that £4,300,000, including £220,000 for working capital would suffice. Devaluation, however, has increased the cost of basic materials, fuel, and some chemicals by nearly £450,000 per year. The Finance Corp. for Industry, which is backing the concern and holds 549,700 ordinary shares, had granted loans totaling £900,000. Now Petrochemicals is trying to raise another £2,500,000 to repay this sum and continue its program.

At the seventy-third annual meeting of Distillers Co., Ltd., the chairman, H. J. Ross, discussed the company's progress in the field of plastics. The company, he said, had benefited from the marked recovery in the plastics industry. British Geon's polyvinyl chloride plant at Barry, South Wales, he went on, has not been able to meet demand and is therefore being enlarged to provide for an increase of 50% in productive capacity. The British Resin Products factory, also at Barry, has been completed, and the company's operations at Feltburn and Tonbridge have been transferred to the new factory. Referring to the progress in petroleum chemicals, Mr. Ross recalled that the affiliated British Petroleum Chemicals, in which Anglo-Iranian Oil Co., Ltd., is also interested, plans to erect a plant at Grangemouth to manufacture styrene monomer. To this end a new company has been formed, Forth Chemicals, Ltd., in which British Petroleum Chemicals, Ltd., holds two-thirds of the capital, and Monsanto Chemicals, Ltd., one-third.

Rubber Trade Notes

The Institution of the Rubber Industry has awarded the Colwyn Medal to A. van Rossem, director of the Rubber Institute, T.N.O., Delft, Netherlands, for conspicuous services to the industry, particularly in the field of research. The award was to be made at the annual I.R.I. dinner on December 8.

The 1951 Foundation Lecture of the I.R.I. will be given by Samuel S. Pickles.

The British Rubber Producers' Research Association and the British Rubber Development Board have jointly formed Rubber Technical Developments, which proposes to exploit new commercial uses for natural rubber to the pilot-plant stage. Inquiries from manufacturers involving the use of natural rubber for special purposes will be welcomed.

In the new House of Commons, Dunlopillo has reportedly been used in upholstering all benches and seats, including the Speaker's chair, and even the stools in the telephone booths.

In the first four months of 1950 the United Kingdom was America's best foreign customer of synthetic rubbers, having bought more than 25% of the total 2,454 tons exported in that period. The United Kingdom took 674 tons, including 497 tons of neoprene, 170 tons of N-type rubbers, seven tons of GR-S.

When the construction of latex storage tanks, with a capacity of 60,000 gallons, has been completed a few months hence, the port of Swansea will be able to import liquid latex in bulk direct from Malaya. The project, undertaken in connection with the expansion of the Dunlopillo factory at the Hirwaun trading estate, will permit the latex being pumped through a new pipe line from the ships to tanks, to be transported by road to the factory.

RUSSIA

According to a report in the foreign press, a Russian footwear factory has developed a method by which it is claimed greatly improved adhesion of rubber soles to leather and fabric uppers is obtainable. A surface of the rubber sole is first treated with dichromic acid at room temperature (to render it hydrophilic), then dried; next the usual nitrocellulose solution is applied, and the sole united to the shoe under pressure of 3.2 to 3.5 atmospheres for 18-25 minutes.

GERMANY

Rubber Industry in Allied Zones

Data concerning the rubber industry in Western Germany during the first half of 1950[1] reveal a hesitating production policy in the first two months of the year, followed by a dip in March, especially noticeable for tires. Plainly, over-optimistic tire manufacturers had produced far more than they could sell and then decided on a much more conservative policy. But in the meantime the price of crude rubber was rising, and the second quarter shows a general upswing which, however, was not strong enough to make up entirely for the preceding decline.

In the period under review, production of all kinds of rubber goods came to 81,410 tons, of which tires, tubes, and tire repair material accounted for 38,759 tons, or 47.6% of the whole. As compared with the first half of 1949, there was a drop of 6.3% in total output and of 18.6% in tires and accessories. Analysis of the monthly quantities reveals that during the first five months of 1950, the output by volume, of the tire industry was from 10 to almost 20% below that of general rubber goods in the same period, but by June, 1950, the former had recovered to such an extent that for the first time in the current year output exceeded that of general rubber goods in the same month. The figures for goods like footwear, drug sundries, toys and sporting goods, belting, mechanical goods (other than hose), although they fluctuated with the general trend of the period, were, unlike those for tires, consistently above the level of the first half of 1949.

Total rubber consumption in the first half of 1950 declined about 4%, a drop wholly due to the sharp reduction in the use of reclaim to almost a third below that in the first half of 1949; the use of natural, and more especially of synthetic rubber, had actually risen somewhat in the 1950 period. The quantities consumed were 33,975 tons natural rubber, 1,433 tons of synthetic rubber, 8,413 tons reclaim rubber, in all 43,821 tons.

The following table shows production of various items during the first half of 1950 and the % increase or decrease as compared with the first half of 1949:

	Production First Half, 1950 Tons	% Increase or Decrease against First Half, 1949
Cycle tires	8,069	—22.4
Motor cycle and automobile tires	10,255	—15.2
Heavy-duty and special tires	17,392	—18.1
Tire repair material	3,043	—21.9
Total	38,759	—18.6
Heels and soles	9,860	—6.2
Rubber footwear	4,671	+66.5
Belting (conveyer)	2,632	+14.6
Lined hose (soft)	3,026	—14.5
Other mechanical rubber goods	12,218	+20.4
Drug sundries, sponge and foam rubber, toys, sporting goods	2,079	+106.5
Rubberized fabrics and goods thereof	1,648	+0.1
Other soft rubber goods	4,465	—8.4
Hard rubber goods	2,052	—14.1
Total	42,651	+8.7
Grand Total	81,410	—6.3

Michelin Pneumatik, A.G., the German branch of the well-known Michelin concern in France, is to rebuild its works in Carlsruhe which had been seriously damaged during the late war.

[1] *Kautschuk und Gummi*, Sept. 1950, p. 305.

High-Frequency Welding Machine for Plastics

A machine for the continuous welding of seams of thin sheets of plastic materials by means of high frequency has been put on the market by the Koch Adler Sewing Machine Works, Bielefeld. The device looks exactly like an ordinary sewing-machine and is manipulated like one. The sheets of plastic to be joined are passed between two electrodes whose pressure against the plastic surfaces is adjusted by means of springs. The high-frequency heat can be regulated by a single button. The appearance of the seams can be modified to meet a wide range of requirements as the electrodes are easily exchangeable and thus permit the use of electrodes with various designs. The machines will weld sheets in thicknesses from 0.01- to 0.15-millimeter.

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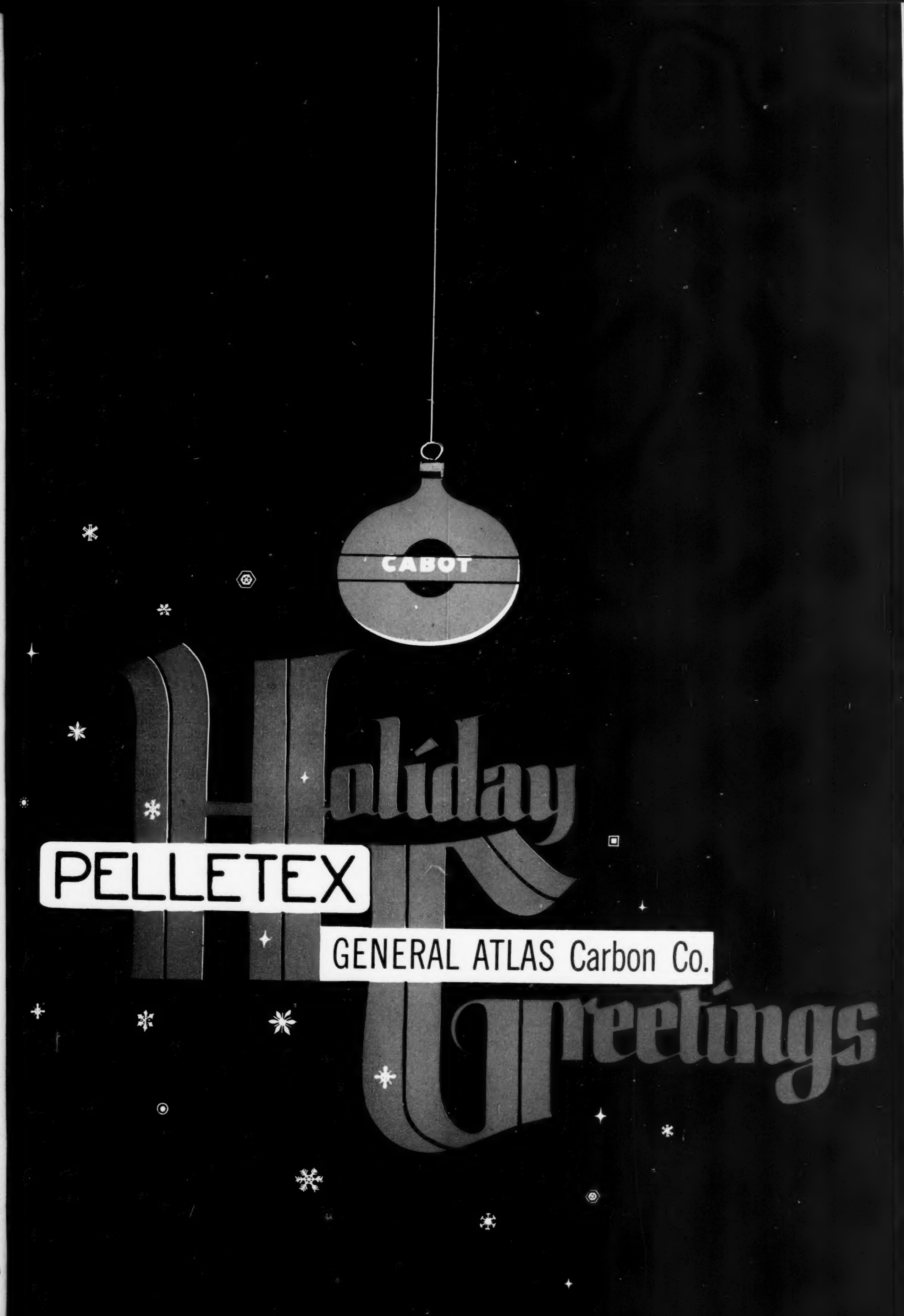
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LATIN AMERICA

CUBA

Increased use of tractors and motor transportation stimulated tire sales during the first half of 1950 and at the same time led to a stepping-up of tire production. It is estimated that 5,000 to 6,000 more tires were sold than in the corresponding 1949 period. Manufacturer-importers and exclusive agents of competitive brands of tires are said to be rationing their dealers and have agreed not to sell to the public, except to owners of fleets of trucks, buses, or cars who have previously been customers. Prices of American and domestic tires have been raised 10%.

Tire production in the first half of 1950 included 17,672 passenger-car tires, 19,206 truck and bus tires, and 22,327 inner tubes of all sizes. Import figures for the first four months of the year cover 2,334 solid tires, 73,889 pneumatic tires, and 30,823 inner tubes, chiefly from the United States.

PERU

In Peru a decline in demand for tires in the first half of 1950 was followed by a sharp cut in production so that output for the period came to only 29,084 units, compared with 39,351 units in the second half of 1949 and 35,843 units in the first half of that year. Output of inner tubes in the 1950 period was 21,256, against 21,590 units in the corresponding 1949 period. The usual seasonal increase in production is expected to be reflected in higher figures in the second half of 1950, and estimates place output for the period at 43,800 tires and 30,500 tubes.

VENEZUELA

The manufacture of rubber goods is a comparatively new industry in Venezuela, having been started in 1942. About 450 workers are employed at present, and the equivalent of $1,373,-100 has been invested in the industry, which produces chiefly tires and tubes, camelback, footwear, and heels and soles. In 1949 an average of 1,091 automobile tires and 2,081 tubes in addition to 1,171 truck tires and 1,217 tubes were produced monthly. To protect the young industry, imports of tires and tubes were put under control in 1949 and for the year ended October 22, 1950, imports of tires for automobiles and trucks and of tubes were limited to 140,000 and 105,000 units respectively. With this protection it is expected that monthly output may reach the record figure of 7,000 units by the end of this year.

Editor's Book Table

BOOK REVIEWS

"Physical Chemistry of High Polymeric Systems." Second Edition. H. Mark and A. V. Tobolsky. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. Cloth, 6 by 9 inches, 517 pages. Price, $6.50.

Reflecting the progress made in most branches of polymer science during the past decade, this new edition has been completely revised and considerably expanded from the first edition (1940). In presenting a condensed but comprehensive selection of basic data on high polymers, the authors have emphasized analysis and discussion of results and given only brief mention of the theoretical foundations and experimental methods. For those interested in obtaining details of the various methods, numerous references have been included. The essentially practical nature of the text is enhanced by the efforts of the authors to present as much data as possible in the form of tables and diagrams and to point out specific cases where methods being discussed were successfully applied.

The scope of the book can be shown by the subjects of the 13 chapters, as follows: geometry of molecules as revealed by diffraction methods; behavior of molecules in electric and magnetic fields; molecular spectra; primary and secondary valence; crystal structure and crystal forces; crystal structure and crystal symmetry; liquids, mesophases, and the amorphous-crystalline character of polymers; thermodynamics of solutions; kinematics of liquids and solutions—viscosity, diffusion, and ultra-centrifugation; mechanical behavior of high polymers; step reaction polymerization; chain reaction polymerization; and degradation of high polymers. Both author and subject indices are appended to the book.

"The Condensed Chemical Dictionary." Fourth Edition. Francis M. Turner, Editorial Director. Fourth edition revised and enlarged by Arthur and Elizabeth Rose. Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. Cloth, 6 by 9 inches, 753 pages, thumb indexed. Price, $10.

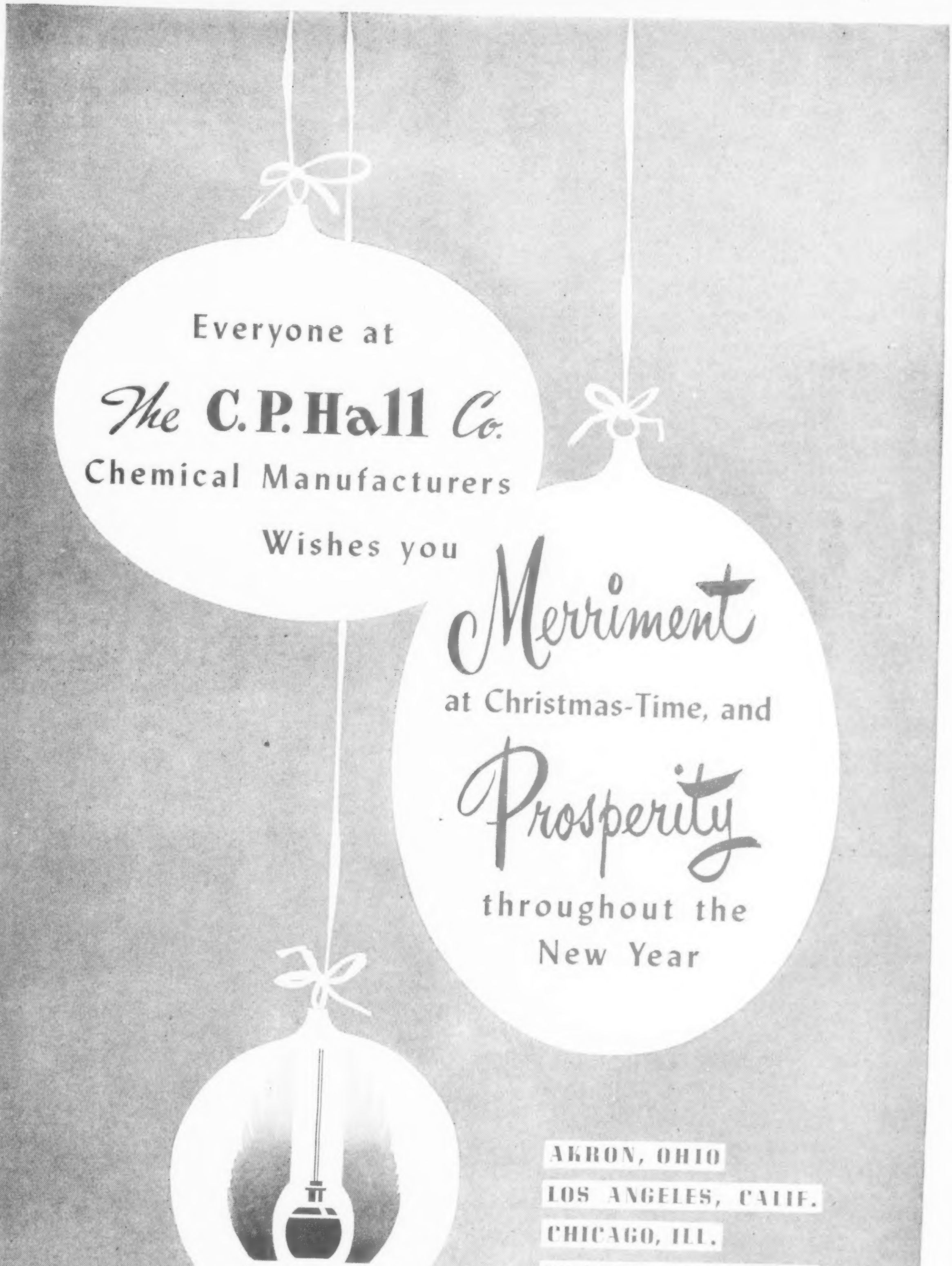
Extensive revised and enlarged from the third edition (1942), the dictionary now covers more than 23,000 chemical materials, products, and trade named items. Data are given on the properties, composition, synonyms, derivations, and applications of each material, together with valuable information on containers, shipping regulations, and safety provisions. Some of the entries of the previous edition have been either condensed or eliminated, but much new material has been added in the fields of nuclear chemistry, chemotherapy, petrochemistry, and others. Other additions include many more cross-references and the keying of all trade names to the list of 400 manufacturers.

The value of this dictionary is self-evident in providing a quick reference to essential data on chemicals and other materials used in the process industries. Of further value are the discussion on transportation of explosives and other dangerous materials and the guide to pronunciation of chemical names which are also included in the book.

"Colloid Science." James W. McBain. D. C. Heath & Co., 285 Columbus Ave., Boston 16, Mass. Trade edition distributed by Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. Cloth, 6 by 9¼ inches, 462 pages. Price: trade edition, $8; text edition, $6.

Designed to give a clear picture of colloid science, its scope and basic principles, this volume will be of great value to graduate students and workers in the field. For those unacquainted with the subject, the book leaves much to be desired. There is little mention of the history of colloid science; no comprehensive discussion of the colloidal state as such appears nor anything on the terminology employed. On the other hand, some of the chapters are extremely well presented, and in all cases the text is clearly and simply written, with many illustrations to clarify and enhance the discussion.

The scope of the book, and also that of the field of colloid science, can be seen by the subject matter of the chapters: emulsions and foam; sorption; effective depth of surfaces; preparation of colloidal sols; optical properties and study of colloids; Brownian movement; ultrafiltration; lyotropic series of ions; viscosity, thixotropy, and plasticity and dilitancy; jellies and gels; coagulation, protective action, and sensitization; electrical and electrokinetic phenomena; diffusion; osmotic pressure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NEW PUBLICATIONS

"12—Hydroxy Stearic Acid; Hydrogenated Castor Oil." Emery Industries, Inc., Carew Tower, Cincinnati 2, O. 8 pages. This publication comprises two descriptive bulletins on two new products, Emery M-358-R 12—hydroxystearic acid and Emery hydrogenated castor oil. Points covered for each product include composition, tentative specifications, typical properties, typical and suggested applications, and bibliography of literature references.

Bulletins of Harwick Standard Chemical Co., 901 Broad St. Bank Bldg., Trenton 8, N. J. **"Low Carbon Black-Resinex."** 1 page. Formulations and test data show that Resinex may be used up to 20 parts to extend carbon black in GR-S compounds. **"Stan-Clay."** 1 page. The analysis and physical specifications of Stan-Clay are given, together with a comparison of the physical properties of Stan-Clay, Champion clay, and Stellar-R clay. **"Stellar-R Clay."** 2 pages. Properties of Stellar-R clay are presented as well as test data on a GR-S-50 stock loaded with 130 parts of the clay.

"Witco Lead Stearates—Stabilizers and Lubricants for Polyvinyl Chloride Plastics." Technical Service Report S-4, November 1, 1950. Witco Chemical Co., 295 Madison Ave., New York 17, N. Y. 2 pages. Information appears on the properties and applications of Witco Lead Stearate #30, a general-purpose lubricant and stabilizer; and Witco Lead Stearate #50, the company's new basic stabilizer and lubricant for vinyls.

"Sales and Business Forecasting in Chemical Process Industries." Robert S. Aries and William Copulsky. Chemonomics, Inc., 400 Madison Ave., New York 17, N. Y. Paper, 6-¾ by 10¼ inches, 142 pages. Price, $5. This book describes the nature of business forecasting, the methods used, applications in the chemical process industries, techniques used in long range forecasting; advantages and disadvantages of the methods; the broad field of forecasting; and statistical data for forecasting.

"R-B-H Resin 510 in Adhesives & Coatings." R-B-H Dispersions, Bound Brook, N. J. 27 pages. Information appears on the effect of Resin 510 on polymeric-type adhesives and coatings. Data covers compatibility with resins, rubbers, and plasticizers, and effect on viscosity and adhesion. Formulations tested include Butyl, neoprene, polyisobutylene, natural rubber, GR-S and nitrile rubber cements.

Pigment Data Bulletins of Pittsburgh Plate Glass Co., Columbia Chemical Division, Fifth Ave. at Bellefield, Pittsburgh 13, Pa. 2 pages each. **"Calcene T."** No. 50-11, **"Silene EF."** No. 50-12. **"Hi-Sil."** No. 50-13. These bulletins give information on the typical properties and applications in the rubber industry of their respective materials.

"Du Pont Rubber Chemicals, Colors, and Neoprenes." Report No. 50-2, August, 1950. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 194 pages. This is the fifth edition of the handbook giving descriptions and instructions for use of the materials offered by the company's rubber chemicals division. In handy looseleaf form, the booklet presents information on the composition, properties, and curing, processing, and other characteristics of each material, together with applicable literature and patent references. Products are grouped according to their type, including accelerators, antioxidants, latex stabilizers and mold lubricants, peptizing agents, miscellaneous chemicals, rubber colors, and neoprene rubbers and latices. Solubility tables and a comprehensive index are also included.

"Operating Procedures for Ethylene Oxide." Carbide & Carbon Chemicals Division, Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. 16 pages. Complete and detailed information is given on the proper procedures for the handling, storage, and unloading of ethylene oxide.

"A Chemical Analysis of the Latex of *Ficus elastica* Planted in Chungking." Kuo Ching Kao and Yu Ming Yeh. Bulletin No. 21, Chungking Institute of Industrial Research. (1949). 7 pages. **"How General Electric Tackles Its Packaging, Packing and Shipping Problems."** Packaging Series Number 33. American Management Association, 330 W. 42nd St., New York 18, N. Y. 58 pages. **"Survival under Atomic Attack."** Executive Office of the President, National Security Resources Board, Civil Defense Office. NSRB Doc. 130. Superintendent of Documents, United States Government Printing Office, Washington 25, D. C. 31 pages. **"List of Inspected Appliances Relating to Accident Hazard Automotive Equipment Burglary Protection."** September, 1950. Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago 11, Ill. 110 pages. **"What It Takes to Make Your Car."** Automobile Manufacturers Association, 320 New Center Bldg., Detroit 2, Mich. 48 pages.

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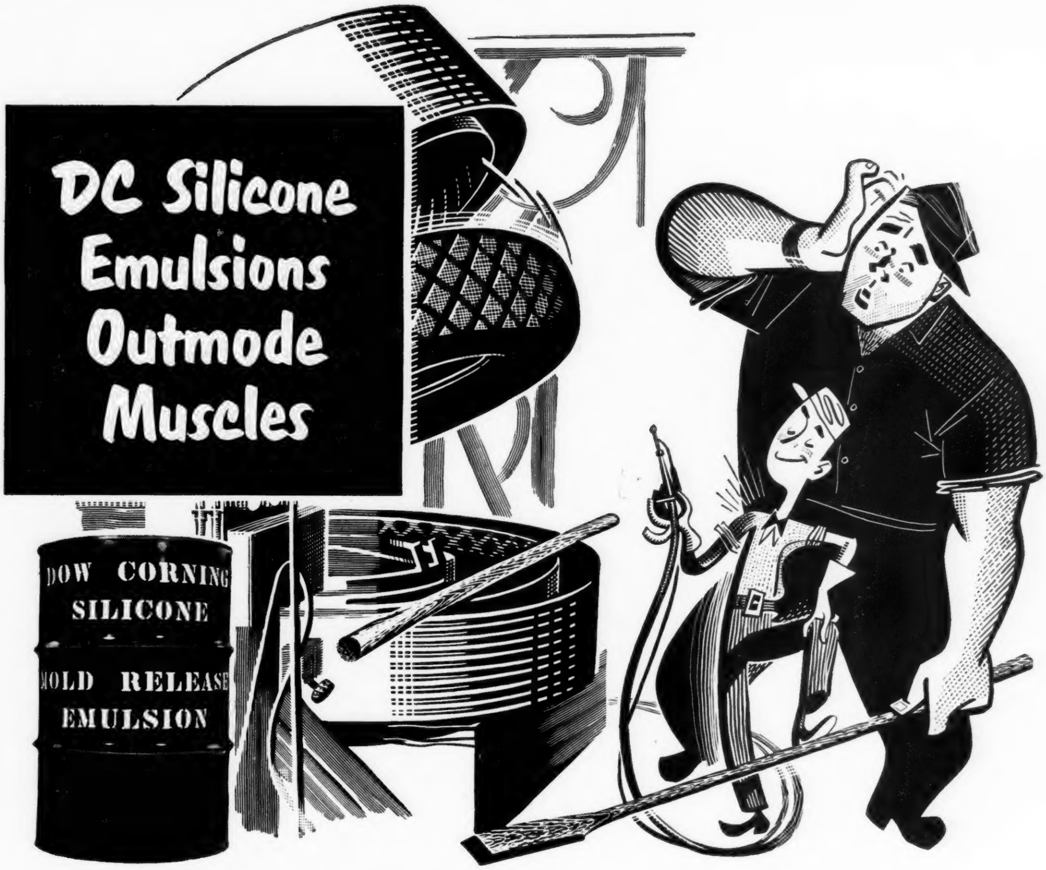

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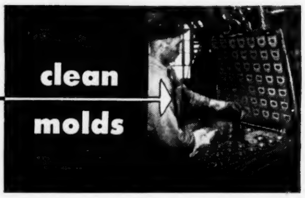

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South Africa

(Continued from page 354)

colors are guaranteed to be fast.

Various kinds of sporting goods that have had to be imported will soon also be made in South Africa. Slazenger, Ltd., manufacturer of sports wares, London, has reportedly acquired a three-acre site in Durban, Natal, where a factory is to be erected for the manufacture of some of the company's specialties. At first only tennis balls and golf balls and golf accessories will be made, but eventually it is planned to add other lines.

That South Africa will not be left behind in regard to developments in the uses of rubber is evidenced by the interest being shown here in the use of rubber for roads. A few months ago the Capetown City Council was said to be investigating the possibility of this type of road material, and it seems to have been the intention, at the time, to lay test strips in various parts of South Africa so as to provide a means of comparing the relative advantages of rubber roads and standard road surfaces. Whether under present circumstances the plans have been put into effect is not known.

Market Reviews

CRUDE RUBBER

Commodity Exchange

WEEK-END CLOSING PRICES

Futures	Aug. 26	Sept. 30	Oct. 21	Oct. 28	Nov. 4	Nov. 11
Jan.	45.00	46.16	56.95	58.50	63.50	75.50
Mar.	43.00	42.55	52.55	53.00	56.25	67.10
May	41.00	40.50	47.50	47.50	48.60	57.00
July	40.20	39.00	45.50	45.00	46.35	53.00
Sept.	39.40	38.00	44.50	44.00	45.35	52.00
Nov.	....	37.00	43.50	43.00	44.35	51.00
Total weekly sales, tons	1,920	3,300	6,160	3,250	7,130	3,060

RUBBER futures prices moved irregularly upward on the Commodity Exchange during the period from October 16 to November 15, with the advance based on the strongly rising foreign markets and the tight statistical position of rubber for nearby delivery. The rising prices in the Singapore market were reported to be based on active stockpile buying by the United States Government, with strong purchasing activity also shown by Russian, Chinese, and Japanese buyers.

Throughout most of the rise the more distant futures positions showed some hesitation in following the lead of the nearby months. This was based on the belief that supplies would be excessive by mid-1951 owing to increased synthetic rubber production and expectations that the high price level will promote greater production of crude rubber in the Far East. Toward the end of the period interest in these distant positions became stronger because of two reasons: (1) the wide discount between the prices for nearby and distant futures resulted in a tendency for some factories to buy rubber for their first-quarter requirements, and (2) some opinion was expressed that accelerated government stockpile buying will do much to skim off the excess natural rubber which may be available later in the year.

With spot prices on the physical market rising by as much as 6.5¢ a pound in one day, while futures were limited to a maximum daily advance of 2¢, or 200 points, the Exchange's board of governors acted on November 9 to prevent the smothering of futures trading by raising the daily trading limit to 400 points. Flexible original margin requirements were also raised to bring margins into line with the new high rubber prices. The previous margin requirements began with $750 per contract, when the rubber price is under 20¢ a pound, and ran up to $5,000 per contract when the price is between 65.00¢ and 69.99¢ a pound. Four new margins were added on November 9, ranging from $6,500, when the price is 70¢ a pound, up to $9,500 per contract when the price is 85¢ a pound or higher.

January futures began the period at 56.90¢, fell to a low of 52.95¢ on October 18, then advanced to 62.50¢ on October 31, 64.50¢ on November 1, and a high of 77.25¢ on November 13, and finally fell off to close at 71.75¢ on November 15. Other futures prices showed corresponding movement. Total sales during October amounted to 19,940 tons, as compared with 14,590 tons sold during September, and sales during the first half of November totaled 10,600 tons.

New York Outside Market

WEEK-END CLOSING PRCES

Futures	Aug.	Sept. 30	Oct. 21	Oct. 8	Nov. 4	Nov. 11
Spot	54.00	52.50	62.00	64.50	69.50	83.00
Dec.	47.50	47.00	57.50	61.00	67.00	80.00
Jan.-Mar.	....	45.50	53.50	57.00	63.00	69.00
No. 3 R.S.S.	53.00	51.50	61.00	63.50	68.50	82.00
No. 2 Brown	46.50	47.50	56.00	58.50	63.50	76.00
Flat Bark	41.50	42.50	51.00	53.50	58.50	68.00

RISING prices and active bidding by domestic manufacturers highlighted the New York Outside Market during the period from October 16 to November 15. With most factories understocked for November and December requirements, demand was active, but dealers and brokers were unable to fill orders in most cases. Dealers point out that most shipments of natural rubber arriving from the Far East are earmarked for the government stockpile, having been purchased abroad. Domestic manufacturers are being squeezed on their requirements for new rubber. Between the consumption cutback order and active government buying, manufacturers cannot get enough rubber to satisfy their requirements. Although the synthetic rubber program has been stepped up, current output is still too small to make up the difference. Although supplies are tight, producers appear to be holding back rubber in an effort to drive prices still higher. This point is borne out by the flood of immediately deliverable rubber that appeared on the market when prices broke toward the end of the period.

The spot price for No. 1 Ribbed Smoked Sheets started at 65.00¢ on October 16, fell back to a low of 60.50¢ on October 18, then advanced to end the month at 70.00¢. From a 71.00¢ level on November 1, the spot price then rose to a high of 87.50¢ on November 9, the highest level since 1926, then fell off to end the period at 74.50¢. No. 3 sheets started at 64.00¢ on October 16, reached a high of 86.00¢ on November 9, and closed at 72.50¢ on November 15. No. 2 Brown and Flat Bark established highs of 80.50¢ and 72.50¢, respectively, on November 9, and ended the period at 67.50¢ and 59.50¢, respectively.

Latices

THE forward market for *Hevea* latex became unsettled during the period from October 16 to November 15 because of the inability of users to determine, with the help of the National Production Authority, how much latex they will be permitted to use during January, according to Arthur Nolan, writing in the November issue of *Natural Rubber News*. The NPA is endeavoring to establish permissible usage in January, but has not been able to do so because of incomplete reports from importers on expected receipts during January. The allotted quotas of *Hevea* latex available to each consumer during January are generally insufficient, and users have appealed for relief. Until these appeals can be acted on by NPA, most consumers are uncertain as to their future course. January latex is being produced on the plantations, and any hesitancy on the part of the United States buyers will cause this latex to be either reduced in volume or diverted to other markets, Mr. Nolan states.

The government latex stockpiling program has started, with some sales already made and at least one delivery completed as of November 15. The recent wide fluctuations in the price of No. 1 sheets have made latex prices very uncertain, Mr. Nolan writes. During October latex prices were relatively firm, running 9.5-12¢ a pound over the sheet price. During the November rubber price fluctuations, latex prices ranged from 82-95¢ a pound, dry weight, and did not maintain a firmly fixed differential over sheet prices at all times. Prices for drummed latex are even higher, and it is believed that the major portion of this source of latex has been bought into the second quarter of 1951. September imports of *Hevea* latex are estimated at 5,117 long tons, dry weight; consumption, 4,589 long tons; and month-end stocks, 4,478 long tons.

Supplies of both neoprene and GR-S latices are extremely tight, Mr. Nolan writes, and supplies of both are under strict rationing. There is some expectation that GR-S latex will become easier in January, with supplies increasing steadily each month thereafter until June. October production of GR-S latex is estimated at 2,773 long tons, dry weight.

RECLAIMED RUBBER

THE reclaimed rubber marked showed no changes during the period from October 16 to November 15, with production and sales continuing at top levels. Reclaimers are refusing all new business and are scaling down all business from regular customers to fit into their allocation systems.

In an effort to minimize inventory and production scheduling problems, reclaimers are discontinuing brands that do not represent large-volume use. This policy has required some customers to change from one brand to another closely related brand, but, in general, has actually resulted in some improvements in customers' products. In addition, mills have largely discontinued the practice of sending out experimental samples of reclaims since there is no guarantee that these reclaims would be available even if the samples should be approved.

Reclaimers take the position that present reclaim prices are too high to stand up permanently in a free rubber market and are trying to reduce costs and improve manufacturing efficiency in preparation for the time when a buyers' market in reclaim will again prevail. The industry believes that the long-term future for reclaim is assured as long as quality is unimpaired and prices remain attractive and is, therefore, making no sacrifices in quality to increase production still further.

Final August and preliminary September statistics on the domestic reclaimed rubber industry are now available. August production totaled 27,312 long tons; imports, 630 long tons; consumption, 26,151 long tons; exports, 800 long tons; and month-end stocks, 31,793 long tons. Preliminary figures for September show a production of 29,399 long tons; consumption, 27,868 long tons; exports, 1,177 long tons; month-end stocks, 32,403 long tons.

There were no changes in the reclaim price picture, and current prices follow:

Reclaimed Rubber Prices

	Sp. Gr.	¢ per Lb.
Whole tire	1.18-1.20	10.00/10.75
Peel	1.18-1.20	nom.
Inner tube		
Black	1.20-1.22	nom.
Red	1.20-1.22	nom.
GR-S	1.18-1.20	nom.
Butyl	1.16-1.18	nom.

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

SCRAP RUBBER

THE scrap rubber market showed some improvement during the period from October 16 to November 15. Demand from consumers was reported to be quite good, and scrap tire prices were much firmer. The price for mixed auto tubes rose $5 per net ton at Akron, but showed no change in the East where most contracts were said to run through November 30. Reclaimers are said to be holding fairly heavy inventories, but replacing the scrap used with new purchases.

Tube prices were unchanged, but somewhat firmer in tone, and demand was reported quite active. Some export business also took place, with shipments of tires to Sweden and tires and tubes to Spain.

Following are dealers' selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$25.00	$30.00
Peelings, No. 1	60.00	60.00
3	35.00	35.00
	(¢ per Lb.)	
Black inner tubes	8.00	8.00
Red passenger tubes	12.00	12.00

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE
WEEK-END CLOSING PRICES

Futures	Aug. 26	Sept. 30	Oct. 21	Oct. 28	Nov. 4	Nov. 11
Mar.	38.40	39.59	39.35	40.60	40.02	41.84
May	38.38	39.35	39.20	40.36	39.76	41.48
July	37.91	38.75	38.77	39.94	39.27	40.95
Oct.	35.15	35.05	35.32	36.40	35.81	36.85
Dec.	34.93	34.88	35.10	36.28	35.50	36.54
Mar.	....	....	34.95	36.50	35.40	36.41

COTTON prices on the New York Cotton Exchange moved irregularly upward during the period from October 16 to November 15. The main factors behind this advance were heavy mill buying, active short covering by traders, the tight statistical position of cotton, strong foreign demand, the unexpectedly low government cotton crop estimate, and the surprisingly large increase in the cotton export quota.

Trade estimates of probable cotton production issued about November 1 ranged from 10,000,000 to 10,500,000 bales. The government crop estimate of 9,945,000 bales, while up 76,000 bales over the previous estimate, came as a surprise to the market and touched off a wave of active buying and covering which carried prices sharply higher.

On November 9 the United States Department of Agriculture announced an increase in the export quota for cotton of 1,350,000 bales, a 62% increase over the previous quota, for the eight-month period ending March 31, 1951. This brought the total quota to 3,496,000 bales for the period, and the increase was said to have stemmed from reductions in requests for cotton by the Armed Services and prospects of an increased crop next year. The announcement came as a great surprise to the market, particularly in view of the small government crop estimate, and resulted in a sharp advance.

The 15/16-inch middling spot price started the period at 38.96¢, reached 41.03¢ on October 31 and 41.20¢ on November 1, and closed at a high of 43.80¢ on November 15. Futures prices showed corresponding advances; March rose from 37.75¢ on October 16 to 40.20¢ on October 31, 40.22¢ on November 1, and closed the period at a high of 42.80¢.

Fabrics

Activity in wide industrial cotton goods was limited to a few odd lots and small quantities of second-hand materials, since most mills are completely sold up through March. Little selling has taken place in the second quarter of next year, although many inquiries have been received. The present tight market situation is expected to continue through the second quarter, with a greater proportion of the production going into the defense program.

Prices were strong on all industrial goods, and many constructions were quoted on a nominal basis. All osnaburgs were reported to be in particularly tight supply, and most inquiries centered in the first quarter.

Cotton Fabrics

Drills		
59-inch 1.85-yd	yd.	$0.475
2.25-yd		.39
Ducks		
38-inch 1.84-yd. S. F.	yd.	nom.
2.00-yd. D. F.	yd.	nom.
51.5-inch, 1.35-yd. S. F.		nom.
Hose and belting		.775
Osnaburgs		
40-inch 2.11-yd	yd.	.335
3.65-yd	yd.	.215
Raincoat Fabrics		
Bombazine, 64x60 5.35-yd	yd.	nom.
Print cloth, 38½-inch, 64x60		.22
Sheeting, 48-inch, 4.17-yd		.25⅞
52-inch 3.85-yd		.28
Chafer Fabrics		
14-oz./sq. yd. Pl.	lb.	.78 /.79
11.65-oz./sq. yd. S.		.73 /.75
10-80-oz./sq. yd. S.		.77
8.9-oz./sq. yd. S.		.785/.795
Other Fabrics		
Headlining, 59-inch 1.35-yd. 2-ply	yd.	.62
64-inch, 1.25-yd. 2-ply		.65
Sateens, 53-inch 1.32-yd		.675
58-inch 1.21-yd		.74
Tire Cords		
K. P. std., 12-3-3	lb.	nom.
12-4-2		nom.

RAYON

PRODUCERS' shipments of rayon to domestic consumers during October totaled 107,800,000 pounds, 8% above shipments in the same month last year. For the first 10 months of 1950 domestic rayon shipments were 1,031,500,000 pounds, 34% greater than corresponding 1949 totals.

Domestic filament yarn shipments during October amounted to 82,500,000 pounds, 4% higher than in the preceding month. Of this total, 54,900,000 pounds were of viscose and cupra yarn and 27,600,000 pounds were of acetate yarn. The viscose and cupra yarn total includes 26,900,000 pounds of viscose high-tenacity (tire type) yarn; the balance is textile-type yarn.

Rayon stocks held by producers on October 31 reached 14,300,000 pounds, an increase of 1,500,000 pounds over stocks on September 30. These month-end stocks included 6,600,000 pounds of viscose and cupra yarn, 3,600,000 pounds of acetate yarn, and 4,100,000 pounds of rayon staple and tow.

No changes were made in rayon tire yarn and fabric prices during the period from October 16 to November 15, and current quotations follow.

Rayon Prices

Tire Yarns	
1100/480	$0.62/$0.63
1100/490	.62
1150/490	.62
1650/720	.61/.62
1650/980	.61
1900/980	.61
2200/960	.61
2200/980	.60
4400/2934	.63
Tire Fabrics	
1100/490/2	.72
1650/980/2	.695/.73
2200/980/2	.685

Carbon Black Statistics—Second Quarter, 1950

Following are statistics for the production, shipments, producers' stocks, and exports of carbon black for the second quarter, 1950. Furnace blacks are classified as follows: SRF, semi-reinforcing furnace black; HMF, high modulus furnace black; FEF, fast extruding furnace black; and HAF, high abrasion furnace black. Statistics on thermal black are included with SRF black to avoid disclosure of individual company operations.

	(Thousands of Pounds) Apr.	May	June
Production:			
Furnace types:			
SRF	23,678	25,014	26,580
HMF	4,950	5,223	6,008
FEF	11,450	13,260	12,332
HAF	15,591	16,853	16,033
	55,669	60,350	60,953
Contact types	49,865	51,573	49,066
TOTALS	105,534	111,923	110,019
Shipments:			
Furnace types:			
SRF	25,288	26,519	29,387
HMF	8,183	9,156	9,903
FEF	11,651	13,869	14,806
HAF	16,958	18,757	19,789
	62,080	68,301	73,885
Contact types	52,787	57,110	53,392
TOTALS	114,867	125,411	127,277
Producers' Stocks, End of Period:			
Furnace types:			
SRF	18,761	17,256	14,449
HMF	17,759	13,826	9,931
FEF	9,419	8,810	6,336
HAF	17,224	15,320	11,564
	63,163	55,212	42,280
Contact types	94,142	88,605	84,279
TOTALS	157,305	143,817	126,559
Exports:			
Furnace types	12,280	9,106	13,892
Contact types	23,232	21,248	23,581
TOTALS	35,512	30,354	37,473

SOURCE: Bureau of Mines, United States Department of the Interior, Washington, D. C.

COMPOUNDING INGREDIENTS

Current Quotations*

Abrasives

Pumicestone, powdered	lb.	$0.025	$0.055
Rottenstone, domestic	ton	36.00	43.00

Accelerators, Organic

A-10	lb.	.40	.47
A-19	lb.	.52	.58
A-32	lb.	.59	.69
A-77	lb.	.42	.55
A-100	lb.	.42	.55
Accelerator 8	lb.	.98	
49	lb.	.48	.49
89	lb.	1.20	
122	lb.	1.30	
552	lb.	1.80	
808	lb.	.59	.61
833	lb.	1.13	1.15
Aero AC 50	lb.	.50	.56
165	lb.	.37	.39
Altax	lb.	.38	.40
Rodform	lb.	.385	.405
Arazate	lb.	2.16	
Beutene	lb.	.59	.64
B-J-F	lb.	.27	.32
Butasan	lb.	1.00	
Butazate	lb.	1.00	
Butyl Eight	lb.	1.00	1.05
Zimate	lb.	1.00	
Captax	lb.	.30	.32
C-P-B	lb.	1.95	
Cumate	lb.	1.45	
Cuprax	lb.	.60	.62
Diesterex N	lb.	.50	.57
DOTG (diorthotolyguanidine)	lb.	.52	.53
DPG (diphenylguanidine)	lb.	.42	.45
El-Sixty	lb.	.61	.68
Ethasan	lb.	1.00	
Ethazate	lb.	1.00	
Ethex	lb.	1.00	
Ethyl Thiurad	lb.	1.00	
Tuads	lb.	1.00	
Tuex	lb.	1.00	
Zimate	lb.	1.00	
Ethylac	lb.	.88	.90
Good-rite Erie	lb.	.32	.34
Hepteen	lb.	.42	.48
Base	lb.	1.80	1.90
Ledate	lb.	1.00	
M-B-T	lb.	.34	.39
-XXX	lb.	.46	.48
M-B-T-S	lb.	.42	.47
Pellets	lb.	.425	.445
Mertax	lb.	.44	.51
Methesan	lb.	1.00	
Methazate	lb.	1.00	
Methyl Selenac	lb.	1.60	
Tuads	lb.	1.10	
Zimate	lb.	1.00	
Monex	lb.	1.10	
Mono-Thiurad	lb.	1.10	
Morfex	lb.	.59	.64
O-X-A-F	lb.	.43	.48
Pentex	lb.	1.00	
Flour	lb.	.20	
Phenex	lb.	.40	.45
Pipazate	lb.	1.53	
Rodform products	lb.	1.00	3.00
Rotax	lb.	.42	.44
S. A. 52	lb.	1.10	
57, 62, 67, 77	lb.	1.00	
66	lb.	1.45	
Safex	lb.	1.15	
Santocure	lb.	.61	.68
Selazate	lb.	1.45	
Selenac	lb.	1.45	
SPDX-GH	lb.	.64	.69
Tellurac	lb.	1.45	
Tepidone	lb.	.55	
Tetrone A	lb.	1.85	
Thalam	lb.	.75	
Thiofide	lb.	.42	.49
Pellets	lb.	.36	.43
Thionex	lb.	1.10	
Thiotax	lb.	.34	.41
Thiurad	lb.	1.10	
Thiuram E	lb.	1.00	
M	lb.	1.10	
Trimene	lb.	.54	.64
Base	lb.	1.03	1.18
Tuex	lb.	1.10	
2-MT	lb.	.75	
Ultex	lb.	1.00	1.10
Ureka Base	lb.	.63	.70
C	lb.	.68	.75
Vulcanex	lb.	.45	
Z-B-X	lb.	2.45	
Zenite	lb.	.42	.44
A	lb.	.50	.52
Special	lb.	.43	.45
Zetax	lb.	.38	.41

Accelerator-Activators, Inorganic

Lime hydrated	ton	8.50	14.00
Litharge, comml.	lb.	.1875	.1985
Eagle, sublimed	lb.	.1975	.1985
National Lead	lb.	.1975	.1985
Red Lead, comml.	lb.	.1975	.2125
Eagle, National Lead	lb.	.2075	
White lead, basic	lb.	.185	.195
Eagle, National Lead	lb.	.185	.195
White lead, silicate	lb.	.1625	.2225
Eagle	lb.	.2025	.2225
National Lead	lb.	.1625	.1725
Zinc oxide, comml.†	lb.	.16	.1925

Accelerator-Activators, Organic

Aktone A, B	lb.	$0.20	$0.21
Barak	lb.	.60	
Curade	lb.	.57	.59
D-B-A	lb.	1.95	
Delac P	lb.	.45	.52
Emersol 110	lb.	.185	.1975
120	lb.	.195	.2075
130	lb.	.2175	.23
210 Elaine	lb.	.19	.2175
Emery 600	lb.	.155	.1875
Guantal	lb.	.51	.58
Hyfac 430	lb.	.195	.2075
431	lb.	.205	.2175
Laurex	lb.	.29	.32
Lead oleate	lb.	.24	
MODX	lb.	.295	.345
NA-22	lb.	1.50	
Palmalene	lb.	.35	
Plastone	lb.	.27	.30
Polyac	lb.	1.60	
Ridacto	lb.	.22	.24
Seedine	lb.	.1485	.1705
SOAC-KL	lb.	.08	.11
Stearex Beads	lb.	.14⅞	.15⅞
Stearic acid, single pressed	lb.	.185	.1975
Double pressed	lb.	.195	.2075
Triple pressed	lb.	.2175	.23
Stearite	lb.	.095	.10
Tonox	lb.	.50	.59
Zinc stearate	lb.	.34	.36

Alkalies

Caustic soda, flake	100 lbs.	3.75	6.67
Liquid, 50%	100 lbs.	2.55	2.75
Solid	100 lbs.	3.35	5.05

Antioxidants

AgeRite Gel	lb.	.60	.62
H.P.	lb.	.67	.69
Hipar	lb.	.91	.93
Powder	lb.	.49	.51
Resin	lb.	.65	.67
D	lb.	.49	.51
Stalite	lb.	.49	.51
White	lb.	1.40	1.50
D	lb.	1.45	1.55
Akroflex C, F	lb.	.67	.69
Albasan	lb.	.69	.73
Aminox	lb.	.49	.58
Antioxidant 2246	lb.	1.60	1.70
Antisol	lb.	.23	.24
Antox	lb.	.49	.51
Aranox	lb.	3.25	
Betanox Special	lb.	.70	.79
B-L-E, -25	lb.	.49	.58
B-X-A	lb.	.43	.52
Copper Inhibiter X-872-L	lb.	1.95	
Deenex	lb.	.95	1.05
Flectol H	lb.	.49	.56
Flexamine	lb.	.67	.76
Heliozone	lb.	.25	.26
Ionol	lb.	.95	1.40
NBC	lb.	1.50	
Neozone A	lb.	.51	.53
C	lb.	.67	
D	lb.	.45	.51
Parazone	lb.	.75	
Perflectol	lb.	.61	.68
Permalux	lb.	1.85	
Rio Resin	lb.	.52	.54
Santoflex 35	lb.	.67	.74
AW	lb.	.66	.73
B	lb.	.49	.56
BX	lb.	.60	.67
Santovar A	lb.	1.40	1.47
O	lb.	1.20	1.27
Santowhite Crystals	lb.	1.55	1.62
L	lb.	.49	.56
MK	lb.	1.25	1.32
S.C.R.	lb.	.32	.34
Sharples Wax	lb.	.23	.28
Stabilite	lb.	.49	.51
Alba	lb.	.72	.77
L	lb.	.60	.62
White	lb.	.49	.56
Powder	lb.	.39	.43
Sunolite	lb.	.20	
Sunproof	lb.	.25	.30
Improved	lb.	.23	.28
Jr.	lb.	.18	.23
Thermoflex A	lb.	.98	1.00
Tonox	lb.	.50	.59
Tysonite	lb.	.215	.2225
V-G-B	lb.	.65	.74
Wing-Stay S	lb.	.48	.58
Zenite	lb.	.33	.35

Antiseptics

Copper naphthenate, 6-8%	lb.	.2475	
G-4	lb.	1.15	2.70
G-11	lb.	3.50	
Pentachlorophenol	lb.	.20	.28
Resorcinol, technical	lb.	.71	.75
Zinc naphthenate, 8-10%	lb.	.23	.2775

Blowing Agents

Ammonium, bicarbonate	lb.	.055	.06
Carbonate	lb.	.20	.21
Sodium bicarbonate	100 lbs.	1.20	5.02
Carbonate, technical	100 lbs.	2.65	3.05
Unicel	lb.	.82	
ND	lb.	1.40	
S	lb.	.20	

Bonding Agents

BAC Latex	lb.	$0.75	$0.80
MDI	lb.	7.00	7.75
50	lb.	3.50	4.00
Ty-Ply Q, S	gal.	6.75	8.00

Brake Lining Saturants

B.R.T. No. 3	lb.	.024	.025
Resinex L-S	lb.	.0225	.03

Carbon Blacks

Conductive Channel—CC

Continental R-20, -40	lb.	.15	.22
Kosmos/Dixie BB	lb.	.18	.215
Spheron C	lb.	.12	.165
N	lb.	.22	.25
Voltex	lb.	.18	.315

Easy Processing Channel—EPC

Continental AA	lb.	.069	.1175
Kosmobile 77/Dixiedensed 77	lb.	.069	.1125
Micronex W-6	lb.	.07	.1225
Spheron #9	lb.	.069	.117
Texas E	lb.	.065	.1075
Witco #12	lb.	.069	.1175
Wyex	lb.	.069	.115

Hard Processing Channel—HPC

Continental F	lb.	.069	.1175
HX	lb.	.069	.115
Kosmobile S/Dixiedensed S	lb.	.069	.1175
Micronex Mk. II	lb.	.07	.1225
Spheron #4	lb.	.069	.117
Witco #6	lb.	.069	.1175

Medium Processing Channel—MPC

Arrow TX	lb.	.069	.115
Continental A	lb.	.069	.1175
Kosmobile S-66/Dixiedensed S-66	lb.	.069	.1175
Micronex Standard	lb.	.07	.1225
Spheron #6	lb.	.069	.117
Texas M	lb.	.065	.1075
Witco #1	lb.	.069	.1175

Conductive Furnace—CF

Statex A	lb.	.08	.10

Fast Extruding Furnace—FEF

Statex M	lb.	.0575	.10

Fine Furnace—FF

Statex B	lb.	.0625	.105
Sterling 99	lb.	.065	.105
105	lb.	.12	.16

High Abrasion Furnace—HAF

Aromex	lb.	.074	.1125
Philblack O	lb.	.075	.119
Statex R	lb.	.075	.125
Vulcan #1, #3	lb.	.074	.117

Medium Abrasion Furnace—MAF

Philblack A	lb.	.0575	.10

High Modulus Furnace—HMF

Continex HMF	lb.	.05	.09
Kosmos 40/Dixie 40	lb.	.05	.09
50/Dixie 50	lb.	.055	.095
Modulex	lb.	.05	.075
Statex 93	lb.	.0525	.095
Sterling L	lb.	.05	.09
SO	lb.	.055	.095

Reinforcing Furnace—RF

Kosmos 60/Dixie 60	lb.	.074	.1125

Semi-Reinforcing Furnace—SRF

Continex SRF	lb.	.035	.075
Essex	lb.	.035	.055
Furnex	lb.	.0375	.08
Gastex	lb.	.035	.075
Kosmos 20/Dixie 20	lb.	.035	.075
Pelletex	lb.	.035	.075
Sterling NS, R, S	lb.	.035	.075

Very Fine Furnace—VFF

Statex K	lb.	.075	.125

Fine Thermal—FT

P-33	lb.	.05	

Medium Thermal—MT

Thermax	lb.	.0325	
Stainless	lb.	.04	

Chemical Stabilizers

Dutch Boy DS-207	lb.	.52	.53
Dyphos	lb.	.5875	.5975
Dythal	lb.	.395	.405
Normasal	lb.	.425	.435
Plumb-O-Sil A	lb.	.2925	.3025
B	lb.	.3075	.3175
C	lb.	.3325	.3425
Tribase	lb.	.265	.275
E	lb.	.2325	.2425
Staflex OY	lb.	1.75	
QMXA	lb.	.60	
Vanstay 16, 25	lb.	.33	.35
H	lb.	.75	.77
Witco Lead Stearate #50	lb.	.5025	
Stabilizer #70	lb.	1.25	

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed; contact suppliers for spot prices.

†For trade names, see Color—White, Zinc Oxide.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

Effective July 1, 1947

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.25 per line (ten words)	Light face type 40c per line (ten words)	Light face type $1.00 per line (ten words)
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Allow nine words for keyed address.

Address All Replies to New York Office at 386 Fourth Avenue, New York 16, N. Y.

Letter replies forwarded without charge, but no packages or samples.

SITUATIONS OPEN

REFINER ROOM FOREMAN. Rubber reclaiming. Must be willing worker and able to supervise department. Steady and excellent proposition for right party. To be considered. state fully, age, marital status, experience, salary expected in first letter. Job located in Eastern Penna. Box 673, c/o INDIA RUBBER WORLD.

RUBBER CHEMIST

Established manufacturer desires college graduate, preferably with 2 - 3 years' experience, although not essential, to do evaluation work in dry and latex rubber compounding on rubber chemicals. Give details of experience, education, and salary requirements.

SHARPLES CHEMICALS INC., PERSONNEL DEPT., WYANDOTTE, MICH.

WANTED: A TIME-STUDY MAN TO TAKE CHARGE OF TIME Study Department in a mechanical rubber goods plant. Applicant must have knowledge of Banbury and mill rooms, tubing department, molded goods department, etc. Give complete data regarding experience, positions held, and salary expected. Address Box No. 677, care of INDIA RUBBER WORLD.

WANTED—FOREMAN: WE CAN OFFER STEADY EMPLOYment, a good salary, and pleasant working conditions to a man experienced in plastic extrusion on electrical wires and cables. Experience with cotton and wire braiding operations is desirable. Central New Jersey location. Address Box No. 678, care of INDIA RUBBER WORLD.

SPONGE RUBBER CHEMIST—REQUIRE MAN WITH EXPERIence and capability. Permanent position with sound, well-financed company. Salary commensurate with ability. Forward detailed résumé of experience and qualifications to Box No. 681, care of INDIA RUBBER WORLD.

WEST COAST INDEPENDENT—ESTABLISHED OVER 25 YEARS

Mechanical Design Engineer

Five years plus experience design and development of special rubber equipment. Plant engineering experience desirable, but not essential. Salary open.

Product Development Engineer

Three years plus experience in mechanical rubber goods development. Compounding experience desirable, but not essential. Salary pen.

Compounder—Chemist or Engineer

Five years plus technical experience compounding and processing development synthetic and natural rubbers. Mechanical goods experience preferred. Salary open. Address Box No. 684, care of INDIA RUBBER WORLD.

RUBBER COMPOUNDER—TECHNICAL SERVICE MAN: SMALL resin manufacturing company supplying the rubber and other industries desires personable individual, under 35 years, with at least B.S. in chemistry. Must have thorough knowledge of rubber compounding and be able to meet the trade occasionally. Technical knowledge of resins and solvents also desirable. Address Box No. 685, care of INDIA RUBBER WORLD.

CHEMIST—SEVERAL YEARS' COMPOUNDING EXPERIENCE molded rubber goods necessary. New England location. Send complete résumé and salary desired. Address Box No. 690, care of INDIA RUBBER WORLD.

SITUATIONS WANTED

FORMER SUPERINTENDENT, GOOD EXPERIENCE IN FOOTwear, cables, molded mechanicals, production and laboratory, wishes connection with eastern manufacturer as plant chemist or superintendent, preferably in molded mechanicals. Employed at present. Address Box No. 672, care of INDIA RUBBER WORLD.

CHEMIST-ENGINEER TECHNICAL SUPERINTENDENT WITH 20 years' experience in the manufacture of tires, mechanicals, floor tile, shoe materials, adhesives, wants technical or management position. Address Box No. 674, care of INDIA RUBBER WORLD.

RUBBER CHEMIST—UNIVERSITY DEGREE—WITH BROAD compounding knowledge and successful administrative record seeks position in production or technical service with small or medium sized organization. Location immaterial. Address Box No. 675, care of INDIA RUBBER WORLD.

ASSISTANT SUPERINTENDENT, TIME AND METHODS ENGINEER with 17 years' experience in rubber footwear and clothing, desires new position. Address Box No. 682, care of INDIA RUBBER WORLD.

SITUATIONS WANTED (Continued)

EXECUTIVE: 25 YEARS' EXPERIENCE IN THE MECHANICAL rubber goods field with plants producing molded, extruded, laminated, cut, punched, etc., products. Background in technical, production, cost, purchasing, sales, industrial engineering and other phases. Medium or small plant preferred. Location immaterial. Address Box No. 676, care of INDIA RUBBER WORLD.

RELIABLE CHEMIST, B.S., ASSISTANT TO CHIEF CHEMIST in pressure-sensitive adhesives, tapes, adhesives from rubber, from lacquer, from polymers, from resins. Vinylite coatings, quarterlining, laminating cements. Extensive and excellent practical experience. Go anywhere. Address Box No. 683, care of INDIA RUBBER WORLD.

PRODUCTION ENGINEER—LATEX DIPPED GOODS. ELEVEN years' experience, production planning and control. Also some experience with molded and extruded products. Age 32, college education. Leadership and administrative ability. Salary secondary to future with progressive company. Address Box No. 686, care of INDIA RUBBER WORLD.

FACTORY OR GENERAL MANAGER—GRADUATE CHEMICAL engineer with 25 years' compounding, technical, production, and general management experience in most types of mechanical rubber goods desires connection with progressive company. Address Box No. 691, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

TOP PRICES PAID FOR OFF-GRADE UNCURED NEOPRENE compounds; also rubber scrap compounds. Will buy lumpy rubber compounds and synthetic rubber compounds. Address Box No. 679, care of INDIA RUBBER WORLD.

WELL AND LONG ESTABLISHED COMPANY SEEKS EXCLUsive source, located in East, for unvulcanized natural and synthetic sheet compounds. Also facilities for applying natural and synthetic compounds to metal mandrels of varying lengths. Large-volume sales assured. Financial aid or investment capital available if desired. Address Box No. 687, care of INDIA RUBBER WORLD.

AN OLD-ESTABLISHED, PROGRESSIVE BRITISH FIRM MAKing footwear, proofings, and mechanical rubber goods would be glad to correspond with Canadian or U. S. firms who may be interested in acquiring manufacturing facilities close to the British and European consumer markets. Address Box No. 688, care of INDIA RUBBER WORLD.

VINYL CHLORIDE COPOLYMER AVAILABLE. Address Box No. 689, care of INDIA RUBBER WORLD.

CONSULTANTS & ENGINEERS

BERLOW AND SCHLOSSER CO.
Consultation and Technical Service
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Molded Specialties—Cut Rubber Thread
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A service to aid industry in producing longer-lasting and better-looking products. Quick predetermination of durability and permanency by actual exposure test in South Florida. Write for full information.
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4201 N. W. 7th St **Miami 34, Fla.**

Where the Compounding and Engineering problems of the Manufacturers may be solved.

(Classified Advertisements Continued on Page 381)

Colors

Black

Black Paste #25	lb.	$0.22	$0.40
BK Iron Oxides	lb.	.11	.1125
Covinylblaks	lb.	.5675	.795
Lampblack, comml.	lb.	.077	.33
Superjet	lb.	.075	.11
Mapico	lb.	.11	.1125
MB Mineral Blacks	lb.	.0315	.0675

Blue

Du Pont	lb.	1.77	4.55
Heveatex pastes	lb.	.80	1.45
Stan-tone	lb.	1.00	1.35
Toners	lb.	.30	3.50

Brown

Brown Paste #5, #10	lb.	.35	.45
Mapico	lb.	.1225	.125
Tan	lb.	.1925	.195
Metallic brown	lb.	.0315	.044
Plastics brown	lb.	.0625	.07
Sienna, burnt	lb.	.0425	.155
Raw	lb.	.045	.1325
Umber, burnt	lb.	.0525	.075
Raw	lb.	.0425	.065

Green

Chrome	lb.	.125	.4675
Oxide	lb.	.375	1.05
Du Pont	lb.	1.50	3.20
G-4099, -6099	lb.	.34	.345
G-7599	lb.	.405	.41
GH-9869	lb.	.85	1.00
9976	lb.	.95	1.10
Heveatex pastes	lb.	.95	1.85
Stan-Tone	lb.	1.50	3.30
Toners	lb.	.35	4.00

Orange

Du Pont	lb.	2.75	
Orange Paste #13	lb.	1.35	1.50
Stan-Tone	lb.	1.65	2.25
Toners	lb.	.30	1.50

Red

Antimony trisulfide	lb.	.55	.68
R. M. P. Sulfur Free	lb.	.63	.68
R. M. P. No. 3	lb.	.55	.60
Cadmium red lithopone	lb.	1.25	1.65
Cadmolith Red	lb.	.92	1.00
Du Pont	lb.	1.32	1.80
Indian Red	lb.	.115	.1175
Iron oxide, red	lb.	.0175	.0975
Light	lb.	.1175	.12
Mapico	lb.	.1175	.12
Red Paste #17, I-2	lb.	.95	1.10
Rub-Er-Red	lb.	.0975	
Stan-Tone	lb.	1.10	3.05
Toners	lb.	.25	4.15

White

Antimony oxide	lb.	.30	.31
Burgess Iceberg	ton	50.00	
Lithopone, titanated	lb.	.095	.105
Cryptone BT	lb.	.085	.095
Titanium pigments:			
Rayox LW	lb.	.195	.205
R-110	lb.	.215	.225
Ti-Cal	lb.	.075	.0825
Ti-Pure	lb.	.195	.225
Titanox A-168,-LO,-MO	lb.	.195	.205
RA, RA-10	lb.	.215	.225
RCHT	lb.	.075	.08
Zopaque	lb.	.195	.205
Zinc oxide, comml.	lb.	.16	.1925
Azo ZZZ-11, -44, -55	lb.	.16	.17
-66	lb.	.1825	.1925
35% leaded	lb.	.16⅝	.17⅝
Eagle AAA, lead free	lb.	.16	.17
5% leaded	lb.	.16	.17
35% leaded	lb.	.16⅝	.17⅝
50% leaded	lb.	.16⅞	.17⅞
Florence Green Seal	lb.	.1775	.1875
Red Seal	lb.	.1725	.1825
White Seal	lb.	.1825	.1925
Horsehead XX-4, -78	lb.	.16	.17
Kadox-15, -17, -22	lb.	.16	.17
-25	lb.	.1825	.1925
Lehigh, 35% leaded	lb.	.1625	.1725
50% leaded	lb.	.16⅞	.17⅞
Protox-166, -167	lb.	.16	.17
St. Joe, lead free	lb.	.16	.17
Standard, 5% leaded	lb.	.16	.17
Zinc sulfide, comml.	lb.	.24	.25
Cryptone ZS	lb.	.20	.21

Yellow

Cadmium yellow lithopone	lb.	1.12	
Cadmolith Yellow	lb.	.92	.100
Chrome	lb.	.30	.31
Du Pont	lb.	1.62	2.15
Iron oxide, yellow	lb.	.0141	.0975
Mapico	lb.	.095	.0975
Stan-Tone	lb.	1.00	1.55
Toners	lb.	.50	1.37
Yellow D	lb.	1.25	1.35

Dispersing Agents

Darvan Nos 1, 2	lb.	.21	.30
Stan-Chem	lb.	.1225	.2587
Triton R-100	lb.	.12	.25

Dusting Agents

D-Tac	lb.	.21	23.
Extrud-o-Lube, conc.	gal.	1.65	
Glycerized Liquid, Lubricant, concentrated	gal.	1.25	
Lubrex	lb.	.25	.30
Mica	lb.	$0.07	$0.0775
Pyrax A	ton	12.50	
W. A.	ton	15.00	
Snow Crest Talc	ton	33.00	35.00
Vanfre	gal.	2.00	2.50

Extenders

B. R. S. 700	lb.	.0175	.026
B. R. T. No. 7	lb.	.0265	.0275
Dielex B	lb.	.06	
Factice, Amberex	lb.	.30	.38
Brown	lb.	.12	.33
Neophax	lb.	.18	1.35
Ozonite	lb.	.2365	
White	lb.	.13	.32
G. B. Asphaltenes	lb.	.06	.065
Mineral Rubbers			
Black Diamond	ton	38.00	40.00
Extender 600	lb.	.18	
Hard Hydrocarbon	ton	38.00	40.00
No. 38	ton	38.00	40.00
Parmr	ton	21.00	29.00
Nuba No. 1, 2	lb.	.04	
No. 3X	lb.	.065	
Rubber substitute, brown	lb.	.18	.317
White	lb.	.16	.33
Sublac B-2, PX-5	lb.	.26	.28
Synthetic 100	lb.	.41	
Vistanex	lb.	.32	

Fillers, Inert

Barytes, floated, white	ton	37.60	61.75
Off-color, domestic	ton	19.00	20.00
No. 1	ton	37.60	52.40
2	ton	35.60	50.40
Blanc fixe	ton	85.00	140.00
Clays:			
Albacar	ton	40.00	50.00
Aluminum Flake	ton	16.00	22.00
#5	ton	21.00	
Champion	ton	14.00	
Crown	ton	14.00	33.00
Hi-White R	ton	15.00	33.00
Hydratex R	ton	30.00	
Paragon	ton	13.50	31.50
McNamee	ton	13.50	
Stan-Tex White	ton	25.00	
Stellar-R	ton	50.00	
Suprex	ton	14.00	33.00
W-1291 English	ton	53.00	55.00
Witco #1	ton	14.00	30.00
#2	ton	13.50	30.00
Cryptone BA, CB, MS	lb.	.08	.0825
Flocks:			
Cotton, dark	lb.	.095	.112
Dyed	lb.	.45	.85
White	lb.	.12	.20
Fabrifil X-24-G	lb.	.095	
X-24-W	lb.	.135	
Filfloc 6000	lb.	.16	
F-40-900	lb.	.105	
Solka-Floc	lb.	.05	.15
Kalite	ton	40.00	
Lithopone, comml.	lb.	.07	.08
Albalith	lb.	.065	.075
Astrolith	lb.	.06⅜	.0675
Eagle	lb.	.0725	.075
Sunolith	lb.	.06⅜	.0675
Mica	lb.	.07	.0775
No. 1 Silica	ton	22.00	40.00
Purecal D	ton	50.00	65.00
M	ton	45.00	65.00
Pyrax A	ton	12.50	
W. A.	ton	15.00	
SL Slate Flour	ton	17.00	25.00
Suspenso	ton	22.00	
Swansdown	ton	20.00	
Terra Alba 1319	ton	27.00	
Ti-Cal	lb.	.0675	
Whiting, limestone	ton	6.00	15.00
Paxinosa	ton	9.00	17.00
Witco	ton	8.50	

Finishes

Black-Out	gal.	4.50	8.00
Flexible Rubber Paints	gal.	4.00	9.00
Flocks			
Cotton, dark	lb.	.095	.112
Dyed	lb.	.45	.85
White	lb.	.12	.20
Rayon, colored	lb.	.90	1.50
White	lb.	.75	1.25
Rubber lacquer, clear	gal.	1.00	2.00
Colored	gal.	2.00	3.50
Shoe varnish	gal.	1.45	
Talc	ton	14.00	35.00
Wax, Bees	lb.	.53	.71
Carnauba	lb.	.85	1.05
Montan	lb.	.155	.32
No. 118, colors	gal.	.86	1.41
Neutral	gal.	.76	1.31
Van Wax	gal.	1.25	1.30

Latex Compounding Ingredients

Accelerator 89	lb.	1.20	
122	lb.	1.30	
552	lb.	1.80	
Acrysol GS, 15% solids	lb.	.13	.185
Aerosol	lb.	.35	
AgeRite Dispersions	lb.	.60	2.25
Amberex Solutions	lb.	.1675	.18
Aquablaks	lb.	.0725	.17
Aquarex D	lb.	.76	
L Paste	lb.	.85	
MDL Paste	lb.	.30	
ME	lb.	.92	
NS	lb.	.60	
SMO	lb.	.50	
WA Paste	lb.	.25	
Areskap 50	lb.	$0.30	$0.38
100, dry	lb.	.60	.72
Aresket 240	lb.	.30	.38
300, dry	lb.	.60	.72
Aresklene 375	lb.	.42	.57
400, dry	lb.	.70	.84
Black No. 25, dispersed	lb.	.22	
Casein	lb.	.29	.37
CW-12	lb.	.85	
CW-37	lb.	.70	
DC Antifoam A	lb.	5.65	6.65
Dispersed Sulfur No. 2	lb.	.10	.12
Ethyl Thiurad	lb.	1.00	
Factice dispersions	lb.	.23	.44
Laton L	lb.	.075	.0775
Ludox	lb.	.1675	.1925
Marmix	lb.	.36	.43
Methocel	lb.	.62	.80
Micronex, colloidal	lb.	.06	.07
Pip-Pip	lb.	1.80	
Pliolite Latex 150, 190	lb.	.32	.41
170	lb.	.37	.46
Polyca 117-SS	lb.	.18	.265
296	lb.	.13	.185
350	lb.	.25	.37
R-2 Crystals	lb.	1.75	
Resin Emulsion #226	gal.	1.05	
#2246	gal.	1.30	
#2402, #2343	gal.	1.60	
A-155	lb.	.13	.18
P-370	lb.	.125	.175
Resin V	lb.	.13	
Santomerse D	lb.	.43	.65
S	lb.	.12	.25
Setsit No. 5	lb.	1.00	
SPDX-GL	lb.	.95	
Stablex A	lb.	.90	1.10
B	lb.	.50	.95
G	lb.	.50	.70
L	lb.	.30	.40
Sulfur Dispersion, 50%	lb.	.07	.15
66%	lb.	.09	.17
73%	lb.	.10	.12
Tamol N	lb.	.1525	.26
Tergitol wetting agents	lb.	.265	.37
Thiocarbanilide (A-1)	lb.	.44	.51
Zinc oxide, dispersed	lb.	.13	.20

Mold Lubricants

Aquarex D	lb.	.76	
L Paste	lb.	.85	
MDL Paste	lb.	.30	
WA Paste	lb.	.25	
Carbowax compounds	lb.	.29	.295
Colite Concentrate	gal.	.90	1.15
ELA	lb.	.80	
DC Mold Release Fluid	lb.	4.14	6.00
Emulsion Nos. 35, 35A, 35B	lb.	1.68	3.50
DC 7	lb.	6.20	6.80
Glycerized Liquid Lubricant, concentrated	gal.	1.32	
Lubrex	lb.	.25	.30
Mold Paste	lb.	.25	
Monten Wax	lb.	.57	
Para Lube	lb.	.046	.048
Polyethylene Glycols	lb.	.23	
Sodium stearate	lb.	.51	.56
Stearite	lb.	.095	.10
Vanfre	gal.	2.00	2.50

Odorants

Alamasks	lb.	.60	6.50
B-3223	lb.	2.50	
Curodex 19	lb.	4.75	
188	lb.	5.75	
198	lb.	6.75	
GD-4440	lb.	3.50	
-5280, -5424, -53481	lb.	2.50	
-5296	lb.	1.25	
-5386	lb.	2.00	
Paradors	lb.	.43	3.25
Resodor Nos. 1, 5	lb.	2.50	
No. 10	lb.	.40	
Rodo No. 0	lb.	4.00	4.50
No. 10	lb.	5.00	5.50

Plasticizers and Softeners

Akroflex C	lb.	.61	.63
Aro Lene #1980	lb.	.10	.12
Bardol	lb.	.025	.035
639	lb.	.025	.0425
B	lb.	.0575	.06
Bondogen	lb.	.55	.60
BRC 20	lb.	.015	.016
30	lb.	.0115	.02
521	lb.	.019	.02
B. R. H. No. 2	lb.	.02	.029
B. R. S. 700	lb.	.0175	.026
B. R. T. No. 7	lb.	.0265	.0275
B. R. V.	lb.	.035	.0515
Bunarax resins	lb.	.055	.115
Bunnatol G. S.	lb.	.40	.505
Butac	lb.	.105	.115
BxDC	lb.	.40	.41
Carbonex	lb.	.0325	.0375
664	lb.	.0375	.0425
645	lb.	.036	.0385
S	lb.	.0425	.0475
S Plastic	lb.	.041	.046
Contogums	lb.	.0875	.111
Cumar EX	lb.	.0525	
MH	lb.	.065	.11
V	lb.	.0975	.1275
Dielex B	lb.	.06	
Dipolymer Oil	gal.	.33	.38
Dispersing Oil No. 10	lb.	.055	.0575
Duraplex C-50 LV, 100%	lb.	.25	.295
Dutrex 6	lb.	.025	.035

CLASSIFIED ADVERTISEMENTS

Continued

MACHINERY AND SUPPLIES FOR SALE

SPECIAL: 1 THROPP 10 x 24 MILL, COMPLETE WITH MOTOR and drive. 2 Ball & Jewell Rotary Cutters #1½ with 30 H.P. motor. 1 Banbury Mixer. 2—37" x 37" 10-opening Hydraulic Presses, 30" rams. Also Tubers, Vulcanizers, Calenders, etc. Send us your inquiries. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York 7, N. Y. Phone: BArclay 7-0600.

FOR SALE: BANBURY MIXERS, MILLS, CALENDERS, LABOratory Mill and Banbury Unit, Extruders, Tubers, Hydraulic Presses. Send for detailed bulletin. EAGLE INDUSTRIES, Inc., 110 Washington Street, New York 6, N. Y. DIgby 4-8364-5-6.

FOR SALE: BALL & JEWELL CUTTERS #1, #2, #2½. DOUBLE-arm jacketed mixers 25 gal. to 250 gal. Stokes Rotary 16-punch pellet presses. PERRY EQUIPMENT CORP., 1524 W. Thompson Street, Phila. 21, Pa.

FOR SALE: FARREL 18" x 45", 16" x 48" & 15" x 36", 2-ROLL Rubber Mills, also new Lab. 6" x 12" Mixing Mills & Calenders, & other sizes up to 84". Rubber Calenders. Extruders 2" to 6". Impregnating Units Lab. size & up. Ball & Jewell Rotary Cutters. Sargent 3-apron conveyer, 6-fan Rubber Drier. Baker Perkins 200-gal. & 100-gal. heavy-duty double-arm jack. Mixers, also 9-gal. & Lab. size. Large stock Hydraulic Presses from 12" x 12" to 42" x 48" platens from 50 to 1500 tons. Stokes Automatic Molding Presses. Hydraulic Pumps & Accumulators. Injection Molding Machines 1 to 16 oz. Stokes & Colton single-punch & rotary preform Tablet Machines, ½" to 2½". Banbury Mixers #00 & up. Grinders & Crushers, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT COMPANY, 90 WEST STREET, NEW YORK 6, NEW YORK.

BANBURY BODIES, "INTERSTATE REBUILT," NO. 11 SPRAY, No. 9 spray, No. 3A spray, all complete with door and cylinder. Available for quick interchange. Write or wire INTERSTATE WELDING SERVICE, Metropolitan Building, Akron, Ohio.

BANBURY PARTS, SURPLUS INVENTORY. ROTORS, END frames, end plates, rotor collars, door tops, and other parts for Banbury's Nos. 3, 3A, 9, and 11. Every part rebuilt to A-1 condition. Quick shipment. INTERSTATE WELDING SERVICE, Metropolitan Building, Akron, Ohio.

(Classified Advertisements Continued on Page 383)

Flexol Plasticizer 3GH	lb.	$0.42	$0.44
3GO	lb.	.515	.535
4GO	lb.	.36	.38
8N8	lb.	.375	.395
DOP	lb.	.43	.455
R-I	lb.	.47	.475
TOF	lb.	.47	.49
TWS	lb.	.405	.425
Galex W-100	lb.	.135	.1725
W-100D	lb.	.1325	.17
Gilsowax B	lb.	.09	.11
Heavy Resin Oil	lb.	.0225	.0375
Hercolyn	lb.	.1112	.1347
Indonex	gal.	.11	.17
Monoplex DBS	lb.	.66	.67
DOA	lb.	.435	.445
DOS	lb.	.64	.65
5	lb.	.70	.71
Morflex 100	lb.	.36	.385
Nevillac oils	lb.	.33	
Resins	lb.	.31	.45
Neville LX-685	lb.	.12	
R Resins	lb.	.105	.155
Nevinol	lb.	.17	
Nevoll	lb.	.0325	.0425
No. 1-D heavy oil	lb.	.055	
Palmalene	lb.	.15	
Panaflex BN-1	lb.	.18	.2325
Para Flux, regular	gal.	.10	.2025
No. 2016	gal.	.165	.24
Heavy	gal.	.155	
Para Lube	lb.	.046	.048
Para Resins	lb.	.04	.045
Paradene Resins	lb.	.065	.075
Paraplex AL-111	lb.	.28	.2875
G-25	lb.	.75	.76
-40	lb.	.45	.46
-50	lb.	.395	.405
-60	lb.	.425	.435
Peptizene #2	lb.	.90	
Pepton 22	lb.	.72	.75
Picco Resins	lb.	.12	.175
480 Oilproof Series	lb.	.16	.21
S. O. S.	gal.	.29	.34
Piccocizer 30	lb.	.055	.06
Piccolastic Resins	lb.	.26	.315
Piccolyte Resins	lb.	.155	.215
Piccoumaron Resins	lb.	.055	.21
Piccovars	lb.	.135	.19
Piccovol	lb.	.025	.04
Pictar	gal.	.25	.30
Pigmentar	gal.	.041	.0534
Pigmentaroil	gal.	.041	.0534
Plastender S	lb.	.04	.0425
Plasticizer 35	lb.	.205	.24
36	lb.	.305	.34
42	lb.	.34	.40
2175	lb.	.46	.56
3425	lb.	.605	
3497	lb.	.61	
3560	lb.	.56	
B	lb.	.35	.45
SC	lb.	.50	.57
Plastogen	lb.	.0775	.08
Plastone	lb.	.22	.30
Polymel 6	lb.	.0675	.10
7	lb.	.23	.28
C-128	lb.	.195	.205
D, H-2	lb.	.22	.24
PS-60 Resin	lb.	.35	
PT67 Light Pine Oil	gal.	.50	.60
101 Pine Tar Oil	lb.	.035	.045
400 Light Pine Tar	lb.	.035	.045
600 Med. Pine Tar	lb.	.035	.045
R-19, R-21 Resins	lb.	.1075	
Reogen	lb.	.1175	.12
Resin C pitch	lb.	.02	.0285
R6-3	lb.	.38	.40
Resinex	lb.	.0325	.0375
L-4	lb.	.0225	.03
Rosin Oil, Sunny South	gal.	.50	.66
RPA No. 2	lb.	.65	
No. 3	lb.	.46	
5	lb.	.57	
RSN Flux	gal.	.10	.19
Rubberol	lb.	.23	
S-Polymers	lb.	.44	
Santicizer B-16	lb.	.52	.57
E-15	lb.	.49	.54
M-17	lb.	.46	.51
No. 140	lb.	.3225	.38
Seedine	lb.	.1485	.1705
Softener #20	gal.	.10	.20
Solvenol	gal.	.56	.58
Staflex IXA	lb.	.36	.37
Staybelite Resin	lb.	.06	.065
Stearex Beads	lb.	.14⅞	.15⅞
Stearite	lb.	.095	.10
Syn-Tac	gal.	.33	.35
Synthol	lb.	.205	
TR-11	lb.	.035	
Turgum S	lb.	.0875	.0975
Tysonite	lb.	.215	.2225
X-1 Resinous Oil	lb.	.0175	.0325
XX-100 Resin	lb.	.0525	

Reclaiming Oils

Bardol	lb.	.025	.035
639	lb.	.025	.0425
B	lb.	.0575	.06
B. R. H. No. 2	lb.	.02	.029
B. R. T. No. 4	lb.	.0225	.0235
B. R. V.	lb.	.035	.0515
BWH-1	lb.	.14	
Dipolymer Oil	gal.	.33	.38
Dispersing Oil No. 10	lb.	.055	.0575
Heavy Resin Oil	lb.	.0225	.0375
LX-77	gal.	.18	.30
-572	gal.	.23	.34
No. 1621	lb.	$0.025	$0.035
3186	gal.	.28	.295
Picco C-10	gal.	.25	.30
C-28	gal.	.33	.38
C-33	gal.	.20	.25
C-42	gal.	.27	.32
D-4	gal.	.23	.28
E-5	gal.	.21	.26
Q-Oil	gal.	.246	.296
PT 101 Pine Tar Oil	lb.	.035	.045
150 Pine Solvent	gal.	.44	.55
RR-10	lb.	.35	
Solvenol	gal.	.56	.58
S. R. O.	lb.	.015	.0225
Wilcor Nos. 111, 151	gal.	.26	.30
X-1 Resinous Oil	lb.	.0175	.0325
-60 Solvent	gal.	.24	.38

Reinforcers, Other Than Carbon Black

Amorez 11-190	lb.	.04	.055
BRC 20	lb.	.015	.016
30	lb.	.0115	.02
521	lb.	.019	.02
Bunarex resins	lb.	.055	.115
Calcene T	ton	60.00	80.00
Calco S. A.	lb.	.80	.83
Carbonex	lb.	.0325	.0375
644	lb.	.0375	.0425
645	lb.	.036	.0385
S	lb.	.0425	.0475
S Plastic	lb.	.041	.046
Clays			
Aluminum Flake	ton	16.50	22.50
No. 5	ton	21.00	
Buca	ton	40.00	
Burgess Iceberg	ton	50.00	
Pigment No. 20	ton	35.00	
No. 30	ton	37.00	
Polyclay	ton	45.00	
Catalpo	ton	30.00	
Crown	ton	14.00	33.00
Dixie	ton	14.00	
Hydratex R	ton	30.00	
L. G. B.	ton	17.00	
Paragon (R)	ton	13.50	31.50
Pigment No. 33	ton	30.00	
Suprex	ton	14.00	32.00
Witco No. 1	ton	14.00	30.00
No. 2	ton	13.50	30.00
Clearcarb	lb.	.1175	.1225
Cumar EX	lb.	.0525	
MH	lb.	.065	.1175
V	lb.	.0975	.1275
G Resin	lb.	.08	
Good-Rite Resin 50	lb.	.36	.38
Hi-Sil	lb.	.11	.125
Klearcarb	lb.	.1225	.1275
Kralac A	lb.	.39	.50
Magnesia, Calcined, Carey	lb.	.28	
K&M	lb.	.31	
Light, No. 101	lb.	.175	
Rubber grade	lb.	.29	.31
Marbon resins	lb.	.38	.45
Millical	ton	27.50	
Multiflex MM	ton	105.00	
Special	ton	125.00	
Neville R Resins	lb.	.10	.155
Panarez resins	lb.	.04	.13
Para Resins 2457, 2718	lb.	.04	.045
Picco Resins	lb.	.12	.17
Piccolyte Resins	lb.	.155	.215
Piccoumaron Resins	lb.	.055	.21
Piccovars	lb.	.135	.19
Pliolite, S-3, -6, -6B	lb.	.38	.45
NR Milled Resin # 50	lb.	.84	.91
S-6 Masterbatches	lb.	.36	.58
PS-60 Resin	lb.	.35	
Purecal U	ton	120.00	135.00
Resin C Pitch	lb.	.02	.0285
Resinex	lb.	.0325	.0375
Rubber Resin LM-4	lb.	.28	.35
S-Polymers	lb.	.44	
Silene EF	ton	120.00	140.00
L	ton	125.00	145.00
Witcarb R	ton	105.00	120.00
R-12	ton	45.00	66.00
Zinc oxide, commercial†	lb.	.16	.1925

Retarders

Cumar RH	lb.	.105	
Delac J	lb.	.55	.60
E-S-E-N	lb.	.36	
Good-Rite Vultrol	lb.	.55	.57
R-17 Resin	lb.	.1075	
Retarder ASA	lb.	.55	
PD	lb.	.34	.36
W	lb.	.43	
Retardex	lb.	.51	.54
RM	lb.	1.25	
Thionex	lb.	1.25	
Vultrol	lb.	.50	.55

Solvents

Bondogen	lb.	.55	.60
Cosol	gal.	.30	.38
Dichloro Pentanes	lb.	.04	.055
Dipentene DD	gal.	.36	.39
GVL	lb.	1.00	
Nevsol	gal.	.185	.25
Panasol High-Solvency Naphtha	gal.	.19	.28
Penetrell	gal.	.36	.39
Picco Hi-Solv Solvents	gal.	.15	.27
Pine Oil D.D.	gal.	.71	.72
PT 150 Pine Solvent	gal.	.44	.55
Skellysolve-E	gal.	.153	
-H	gal.	.133	
-R, -V	gal.	.109	
-S	gal.	.099	
Tollac	gal.	$0.195	$0.25
2-50-W Hi-Flash Solvent	gal.	.37	

Synthetic Resins

Geon Latices (dry wt.)	lb.	.465	.60
Paste Resins	lb.	.34	.60
Plastics	lb.	.365	.85
Polyblend	lb.	.43	.58
Polyvinol resins	lb.	.34	.58
Marvinol VR-10, -20	lb.	.36	.52

Synthetic Rubbers and Latices

Chemigum 30-N-4, 50-N-4	lb.	.475	.545
N-1	lb.	.61	.68
N-3	lb.	.55	.62
Latex (dry wt.)			
101-A, -AX, -E	lb.	.32	.41
200	lb.	.425	.525
235-A, -B	lb.	.50	.60
245-A, -B	lb.	.425	.525
Hycar OR-15, -15EP	lb.	.52	.53
OR-25, -25 EP	lb.	.45	.46
OR-25 NS	lb.	.47	.48
OS-10	lb.	.50	.51
Hycar Latex (dry wt.)			
1501, 1531, 1551	lb.	.49	.54
1502, 1552, 1562	lb.	.42	.47
1532	lb.	.435	.485
Neoprene Latex (dry wt.)			
Type 571, 842 842-A	lb.	.32	.43
572, 700	lb.	.33	.44
601, 601-A	lb.	.35	.46
735	lb.	.36	.47
Neoprene Type AC, CG	lb.	.50	.53
E	lb.	.65	.68
FR, KNR	lb.	.75	.78
GN, GN-A, S	lb.	.35	.38
RT, W	lb.	.37	.40
Paracril 18-80	lb.	.43	.45
26NS60, 26NS90	lb.	.44	.46
35NS90	lb.	.51	.53
Paracril Latex Type H (55%)	lb.	.38	.42
Paraplex X-100	lb.	1.00	
Silastic	lb.	2.35	4.05

Tackifiers

Bunarex resins	lb.	.0625	.1125
Contogums	lb.	.0875	.11
Galex W-100	lb.	.135	.1725
W-100D	lb.	.1325	.17
Hercolyn	lb.	.1122	.1347
Indopol H-100	gal.	.85	1.00
H-300	gal.	1.12	1.27
Natac	lb.	.10	.11
Nevindene	lb.	.125	.155
Picco-10, -25	lb.	.125	.175
Piccolastic Tackifiers	lb.	.26	.315
Piccolyte Resins	lb.	.155	.215
Piccoumaron resins	lb.	.055	.21
Staybelite Resin	lb.	.06	.065
Synthetic 100	lb.	.41	
Synthol	lb.	.22	
Vistanex	lb.	.32	

Vulcanizing Agents

Dibenzo G-M-F	lb.	2.50	
Ethyl Tuads	lb.	1.00	
G-M-F	lb.	2.50	
Litharge, commercial	lb.	.1875	.1985
Eagle, sublimed	lb.	.1975	.1985
National Lead	lb.	.1975	.1985
Magnesia, calcined	lb.	.29	.31
Carey	lb.	.28	
K&M Neoprene Grade	lb.	.31	
Light No. 101	lb.	.175	
Methyl Selenac	lb.	1.60	
Tuads	lb.	1.10	
Red Lead, commercial	lb.	.1975	.2125
Eagle, National Lead	lb.	.2075	
Sulfur flour, comml.	100 lbs.	1.70	2.50
Black Bird	lb.	.036	.041
Calco	lb.	.0195	.053
Crystex	lb.	.195	
Insoluble 60	lb.	.13	.135
Rubbermakers	100 lbs.	1.75	2.45
Spider Brand	lb.	.023	.044
Stauffer	lb.	.0175	.0285
Telloy	lb.	2.00	
Vandex	lb.	2.00	
Vultac Nos. 1, 2	lb.	.38	.45
No. 3	lb.	.42	.49
White lead silicate	lb.	.1625	.2225
Eagle	lb.	.2025	.2225
National Lead	lb.	.1625	.1725

Trade Lists Available

The Commercial Intelligence Branch, United States Department of Commerce, Washington, D. C., recently compiled the following trade lists, of which mimeographed copies may be obtained by American firms from this Branch and from Department of Commerce field offices at $1 a list for each country.

Rubber Goods Manufacturers—Argentina; Ecuador; Greece; India; Mexico; Netherlands; Spain; Switzerland.

Rubber-Stamp & Stencil (Mimeograph) Manufacturers—Denmark.

Tire Retreaders, Recappers & Repairmen—Colombia.

CLASSIFIED ADVERTISEMENTS
(Continued)

MACHINERY AND SUPPLIES FOR SALE (Continued)

16" x 40" FARREL FOUNDRY & MACHINE 2-ROLL MILL, WITH flexible coupling and stainless steel scrapers. Excellent condition. #3 John Royle Rubber Extruder, 4½" dia. screw, complete with gear reducer. We are interested in your surplus equipment. What have you to offer? SILVER BROTHERS, 7-11 Mary St., Hamilton, Ont., Canada. Phone: 2-3505-6.

MACHINERY AND SUPPLIES WANTED

WANTED: USED HYDRAULIC PRESSES. THOSE WITH STEAM platens preferred. Please send description and price. MECHANICAL RUBBER PRODUCTS CO., Warwick, New York.

WANTED TO PURCHASE: MOLDS FOR BICYCLE AND VELOCIPEDE handlebar grips. Send full information to Box No. 680, care of INDIA RUBBER WORLD.

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DRESS SHIELD LININGS
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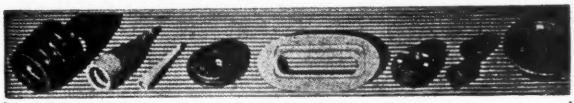
SANITARY WEAR
RUBBERIZED SHEETING
RUBBER APRONS
STOCKINET SHEETS
RUBBER SHEETS
RAINCAPES & COATS
RUBBER SPECIALTIES
DOLL PANTS, CAPES, ETC.
RUBBER DAM & BANDAGES — SHEET GUM
RAND RUBBER CO. BROOKLYN, N. Y. U. S. A. MFRS.

WANTED — Large engineering firm wishes to acquire several complete Rubber Plants through purchase of (1) capital stock, (2) assets, (3) machinery and equipment, whole or in part. Personnel retained where possible, strictest confidence. Box 1220, 1474 Broadway, New York 18, N. Y.



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Representatives
Akron San Francisco New York

HOWE MACHINERY CO., INC.
30 GREGORY AVENUE PASSAIC, N. J.
Designers and Builders of
"V" BELT MANUFACTURING EQUIPMENT
Cord Latexing, Expanding Mandrels, Automatic Cutting, Skiving, Flipping and Roll Drive Wrapping Machines.
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India RUBBER WORLD
386 FOURTH AVE. NEW YORK 16, N. Y.

United States Imports, Exports, and Reexports of Crude and Manufactured Rubber

	August, 1950	
	Quantity	Value
Imports for Consumption of Crude and Manufactured Rubber		
UNMANUFACTURED, Lbs.		
Crude rubber	151,009,698	$36,092,742
Latex	11,767,242	3,721,184
Chicle, crude	582,911	532,700
Guayule	78,400	9,671
Balata	383,304	102,985
Jelutong or Pontianak	524,529	200,912
Gutta percha	103,935	41,790
Synthetic rubber	5,863,936	1,011,272
Reclaimed rubber	734,392	44,310
Scrap rubber	6,129,344	185,113
TOTALS	177,177,691	$41,942,679
MANUFACTURED		
Tires and casings: auto, etc. *no.*	4,196	$45,028
Bicycle *no.*	3,076	2,637
Other *no.*	4,178	2,460
Inner tubes: auto, etc. *no.*	74	107
Rubber footwear:		
Boots *prs.*	4,008	7,894
Shoes and overshoes *prs.*	13,240	15,663
Rubber-soled canvas shoes *prs.*	7,495	5,025
Athletic balls: golf *no.*	26,040	5,777
Tennis *no.*	35,532	7,813
Other *no.*	46,392	1,969
Rubber toys, except balloons	......	38,129
Hard rubber products	......	33,801
Rubber and cotton packing *lbs.*	175	397
Gaskets and valve packing	......	325
Molded rubber insulators	......	13,399
Rubber belting *lbs.*	12,304	12,821
Hose and tubing	......	4,103
Drug sundries	......	5,731
Instruments *doz.*	358	1,247
Gutta percha manufactures *lbs.*	1,430	1,272
Rubber heels and soles *lbs.*	1,146	149
Bands *lbs.*	360	310
Synthetic rubber products	......	92
Other soft rubber products	......	75,586
TOTALS	......	$281,735
GRAND TOTALS, ALL RUBBER IMPORTS	......	$42,224,414
Reexports of Foreign Merchandise		
UNMANUFACTURED, Lbs.		
Crude rubber	2,251,884	$914,279
Scrap rubber	211,200	15,120
TOTALS	2,463,084	$929,399
MANUFACTURED		
Toy and novelty balloons	......	$385
Rubber toys and balls	......	4,011
Tires and casings: Farm tractor, etc. *no.*	339	10,221
Inner tubes *no.*	66	310
Latex and other compounded rubber for further manufacture *lbs.*	30,000	12,600
Other natural and synthetic rubber manufactures	......	1,182
TOTALS	......	$28,709
GRAND TOTALS, ALL RUBBER REEXPORTS	......	$958,108
Exports of Domestic Merchandise		
UNMANUFACTURED, Lbs.		
Chicle and chewing gum bases	261,662	$98,990
Balata	873	2,190
Synthetic rubbers: GR-S	168,005	44,062
Butyl	978,569	347,945
Neoprene	258,037	116,969
Nitrile	1,000	200
"Thiokol"	4,100	2,950
Polyisobutylene	3,100	1,127
Other	1,625	2,395
Reclaimed rubber	1,791,252	160,039
Scrap rubber	4,420,016	191,325
TOTALS	7,888,239	$968,192
MANUFACTURED		
Rubber cement *gals.*	78,539	$142,646
Rubberized fabric: auto cloth *sq. yds.*	3,668	3,366
Piece goods and hospital sheeting *sq. yds.*	59,560	34,828
Rubber footwear:		
Boots *prs.*	6,452	26,747
Shoes *prs.*	2,674	1,978
Rubber-soled canvas shoes *prs.*	20,950	34,384
Rubber soles *doz. prs.*	20,483	57,863
Heels *doz. prs.*	47,348	42,333
Soling and toplift sheets *lbs.*	252,766	50,498
Gloves and mittens *doz. prs.*	9,680	36,162
Drug sundries: hot water bottles and fountain syringes *no.*	8,581	6,294
Other	......	176,056
Rubber and rubberized clothing	......	100,547
Toy and novelty balloons	......	25,657
Rubber toys and balls	......	42,805
Erasers *lbs.*	16,702	10,557
Hard rubber goods: battery boxes *no.*	18,444	27,581
Other electrical goods *lbs.*	144,603	79,423
Combs, finished *doz.*	4,788	4,989
Other	......	6,056
Tires and casings: truck and bus *no.*	43,887	1,684,895
Auto *no.*	30,657	397,736
Aircraft	......	63,607
Farm tractor, etc. *no.*	4,824	174,726
Other off-the-road *no.*	5,258	459,913
Bicycle *no.*	9,745	11,290
Motorcycle *no.*	354	2,710
Other *no.*	3,192	41,496
Inner tubes: auto *no.*	13,947	32,662
Truck and bus *no.*	18,569	74,675
Aircraft *no.*	259	2,446
Other *no.*	7,231	20,199
Solid tires: truck and industrial *no.*	1,184	31,621
Tire repair materials: camelback *lbs.*	127,693	38,770
Other *lbs.*	207,138	159,527
Rubber and friction tape *lbs.*	33,035	22,227
Belting: auto and home *lbs.*	71,202	81,034
Transmission:		
V-belts *lbs.*	98,192	148,653
Flat belts *lbs.*	31,241	33,708
Other *lbs.*	23,042	22,424
Conveyer and levitator *lbs.*	86,393	88,525
Other *lbs.*	48	370
Hose and tubing *lbs.*	402,738	246,961
Rubber packing *lbs.*	140,165	125,551
Mats, flooring, tiling *lbs.*	408,361	100,315
Thread, bare *lbs.*	6,992	10,405
Textile covered *lbs.*	13,912	35,670
Gutta percha manufactures *lbs.*	700	967
Latex and other compounded rubber for further manufacture *lbs.*	775,764	215,131
Other natural and synthetic rubber manufactures	......	298,087
TOTALS	......	$5,537,071
GRAND TOTALS, ALL RUBBER EXPORTS	......	$6,505,263

SOURCE: Bureau of Census, United States Department of Commerce, Washington, D. C.

United States Rubber Statistics — August, 1950

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		Month-End Stocks
	Production	Imports	Total	Consumption	Exports	
Natural rubber, total	0	67,720	67,720	59,382	1,005	82,934
Latex, total	0	5,253	5,253	4,915	0	4,212
Rubber and latex, total	0	72,973	72,973	64,297	1,005	87,146
Synthetic rubber, total	*38,488 †5,462	2,618	46,568	50,379	627	63,654
GR-S types	*33,587 †40	2,072	35,699	39,025	75	47,871
Butyl	*4,901	546	5,447	6,054	0	7,974
Neoprene	†4,246	0	4,246	4,031	437	5,231
Nitrile types	†1,176	0	1,176	1,269	115	2,578
Natural rubber and latex, and synthetic rubber, total	43,950	75,591	119,541	114,676	1,632	150,800
Reclaimed rubber, total	27,312	328	27,640	26,151	800	31,793
GRAND TOTALS	71,262	75,919	147,181	140,827	2,432	182,593

*Government plant production.
†Private plant production.
SOURCE: Rubber Division, ODC, United States Department of Commerce, Washington, D. C.

Estimated Automotive Pneumatic Casings and Tube Shipments, Production, Inventory, September, August, 1950; First Nine Months, 1950-1949

	September, 1950	% of Change from Preceding Month	August, 1950	First Nine Months, 1950	First Nine Months, 1949
Passenger Casings					
Shipments					
Original equipment	3,415,067		3,646,552	27,640,551	21,931,140
Replacement	3,511,661		5,337,368	36,733,230	28,387,962
Export	48,481		56,406	433,941	353,862
TOTAL	6,975,209	—22.84	9,040,326	64,807,722	50,672,964
Production	6,620,742	— 5.35	6,994,685	59,345,060	49,126,921
Inventory end of month	3,497,333	— 8.82	3,835,638	3,497,333	7,133,372
Truck and Bus Casings					
Shipments					
Original equipment	398,857		446,054	3,469,754	2,812,127
Replacement	788,194		1,062,093	7,204,165	5,031,256
Export	64,054		61,083	558,311	726,906
TOTAL	1,251,105	—20.27	1,569,230	11,232,230	8,570,289
Production	1,194,871	+ 1.41	1,178,244	10,420,621	8,444,810
Inventory end of month	925,699	— 4.14	965,643	925,699	1,796,705
Total Automotive Casings					
Shipments					
Original equipment	3,813,924		4,092,606	31,110,305	24,743,267
Replacement	4,299,855		6,399,461	43,937,395	33,419,218
Export	112,535		117,489	992,252	1,080,768
TOTAL	8,226,314	—22.46	10,609,556	76,039,952	59,243,253
Production	7,815,613	— 4.37	8,172,929	69,765,681	57,571,731
Inventory end of month	4,423,032	— 7.88	4,801,281	4,423,032	8,930,077
Passenger and Truck and Bus Tubes					
Shipments					
Original equipment	3,807,464		4,094,683	31,101,448	24,662,998
Replacement	3,681,537		5,048,400	32,634,249	24,666,082
Export	66,891		65,594	554,330	697,171
TOTAL	7,555,892	—17.95	9,208,677	64,290,027	50,026,251
Production	7,073,600	— 2.35	7,243,695	59,800,909	49,387,269
Inventory end of month	6,129,401	— 7.40	6,619,472	6,129,401	8,874,877

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

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